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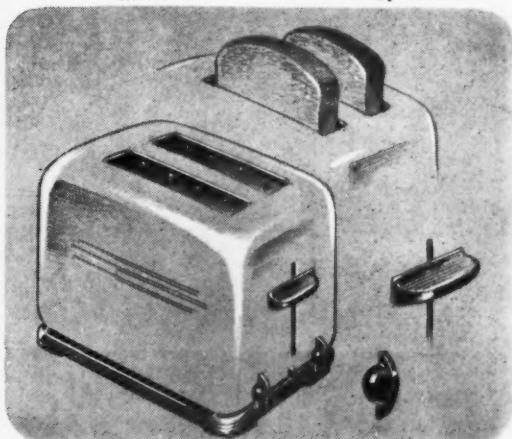
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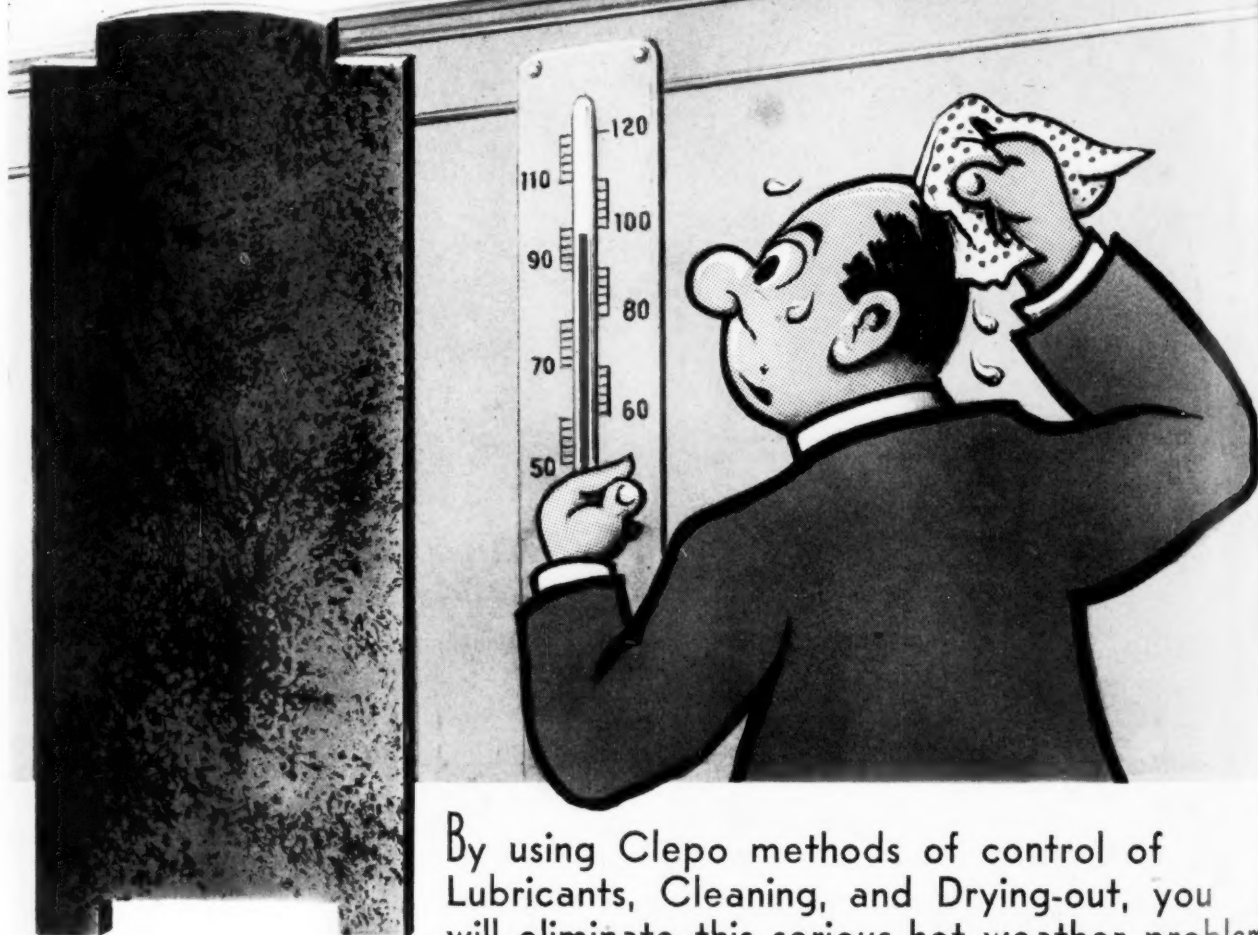
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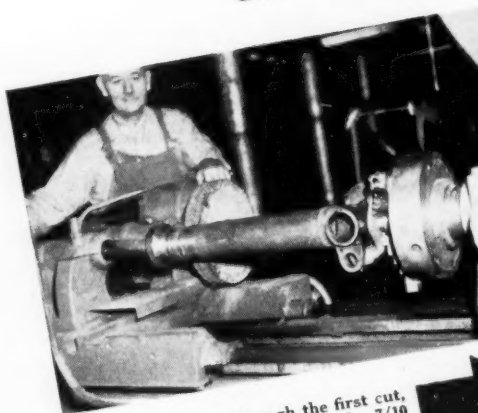
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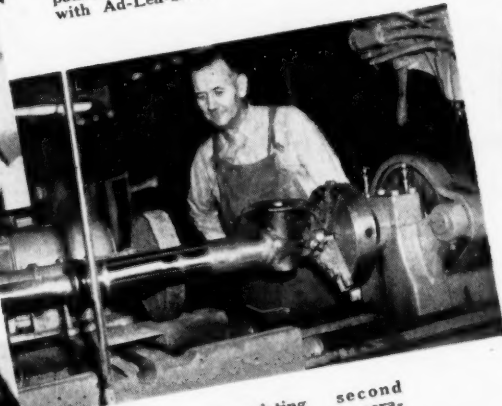
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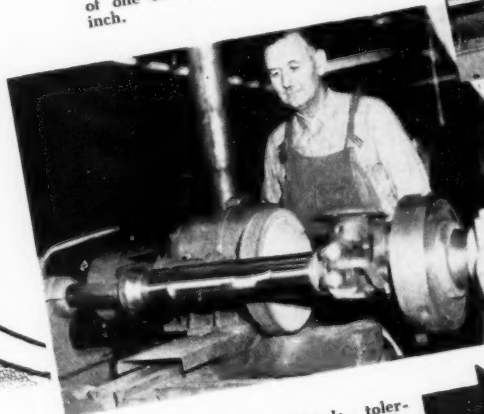


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## Reputations Are More Easily Lost Than Gained

Electroplating has fought long and hard since the First World War to rise from its status of employment almost exclusively as a means for making a cheap metal look like a more expensive one, to its present position in the field of metal protection. Here, its inherent advantages enable it to compete on an equal basis with alternative protective coatings, which include hot-dipped and sprayed metals, vitreous and organic coatings and metal cladding.

Recognition of the value of electroplated coatings for wear and corrosion prevention has led to unceasing efforts to improve the process. We remember when, not very many years ago, 0.0001" was considered a very heavy nickel plate. How far we have progressed since, is best indicated by the recent recommendations of Committee B-8 of the American Society for Testing Materials that a fourth type of coating be added to the three types now covered in the Society's specifications for electrodeposited coatings of nickel and chromium on steel, the new type requiring a minimum of 0.0020" copper plus nickel.

This is in line with the post-war plating plans of the automotive industry, which has learned, by bitter experience, the desirability of heavy deposits. To conserve these metals, the thickness of copper and nickel on automotive hardware was drastically reduced late in 1941 and in 1942. As a result, because of rusted and corroded trim, many of the cars produced during that period have been a source of embarrassment to their manufacturers and have reflected no credit on electroplating as a protective process.

When nickel again becomes available, there will be a mad scramble for the available supplies, and, since the metal will undoubtedly be apportioned from stocks on hand and current production, very few users will receive sufficient metal immediately to load up their anode rods. At the same time there will be insistent pressure for shipment of finished goods. The short-sighted manufacturer, without a sense of responsibility, will crowd his tanks, decrease his plating time and turn out the maximum possible amount of production—with an inferior plated finish.

The far-sighted manufacturer, however, with understandable pride in his product, will see to it that every article he finishes will be a credit to his reputation, even though it means lower production rates at the start. We must depend on such manufacturers for the continued public acceptance of plating as the most desirable protective finish for a long list of products and for the good of our industry we hope that they are in the overwhelming majority when the bars are let down.

# CORROSION IN THE TROPICS

## Big Bad Wolf of the Pacific War Theatre

By GEORGE W. GRUPP

*Navy War Correspondent*

**M**ANY things, including metal finishes and organic protective coatings, which are thought to be reasonably durable are quickly laid low by the agencies of corrosion under the tropical conditions of the Central and South Pacific—as experienced by the United States Pacific Fleet. With the mischievousness of little elves these corrosion forces tantalize the powers of man to resist them. They are constantly engaged in their mission to change the form of matter—to convert tangible materials and products into invisible gases; and they do it at a rate of speed which is amazing to persons who lived only in temperate or dry climates. To put this another way, the United States Pacific Fleet is not only fighting against the Japanese, but it is also engaged in battle against the agencies of corrosion.

The Navy is fully aware of its corrosion problem in the South Pacific; and is always ready to use new methods of prevention. It has sought the cooperation of industry by making it familiar with the South Pacific corrosion problem. It has not neglected to remind industry that the transportation of

products and parts is about three times as great to the South Pacific as it was to the European theatre of war. Industry has been told that products and parts which are received at a Pacific advance base in a damaged condition, due to corrosion, may cost the lives of many young Americans.

Now one should not think that because some progress has been made with the corrosion problem that it has been completely solved. That would be a false conclusion. It is true that many departments of industry have learned how to better preserve their products and parts for trans-Pacific shipment and usage; but there are still a lot of things to learn.

The South Pacific forces of corrosion cause galvanized screening to turn into dust within a period of three to four months. Copper screening disintegrates less rapidly; and bronze screening seems to stand up best. Unfortunately, however, blue steel tacks are sometimes used to fasten the screen to the frames of tents or quonset huts. Naturally, the use of such tacks accelerates the rate of corrosion.

Since screening is an important defense against the prolific propagation of insects in the tropics, and since metal screening being put to a severe test of durability in the South Pacific, plastic screening has been introduced. But even this kind of screening is not above fault, for it must be washed frequently because the apertures are quickly closed up with particles of foreign matter from the air.

Turning one's attention to airplanes it can be observed that their wings look as if they were sand blasted after making some flight through South Pacific tropical atmosphere which are laden with ammonia producing micro-organisms of animal and vegetable matter from the sea water and with invisible grains of coral sand.

Close examination reveals that many of the South Pacific islands are of coral formation. A gentle breeze is always blowing over them; but sometimes this breeze whips up into the fury of a hurricane or typhoon.

Now as the wind blows over the sea it drives droplets of spray (surface sea water is usually saturated with oxygen and combined with the presence of animal and vegetable matter) into the air. When these droplets of salt saturated water dry on metal they form a salt film which is ready to absorb moisture from the air to renew their corrosion activities. And with a little coral sand agitation, intensified by high wind velocity, the rate of corrosion is increased. In other words, the life of metals in the South Pacific is affected by surrosion—the combined result of abrasion and corrosion. For this reason the surface protective coating must be harder than the basis metal if it is to have any practical value.

In studying the South Pacific surrosion problem one should not be unmindful of the condition that some of the islands, such as Iwo Jima, are of volcanic origin and that their atmospheres are filled with sulphur compounds. These compounds settle on metal and produce small concentration cells which accelerate corrosion. As a result brass and bronze stand up better than copper in this kind of atmosphere.

The periodic oceanic eruptions of hydrogen sulphide in the South Pacific always accentuate corrosion.

Some may say that rains should remove the agencies of corrosion. That may be true in a temperate climate, but in the tropics, where there is a lot of rain the normal visible invisible oxide protective film which forms on plating or, metals is washed off; and the air with its chloride compounds of the salt water, the high humidity and heat get to work destroying the metal finish and metal

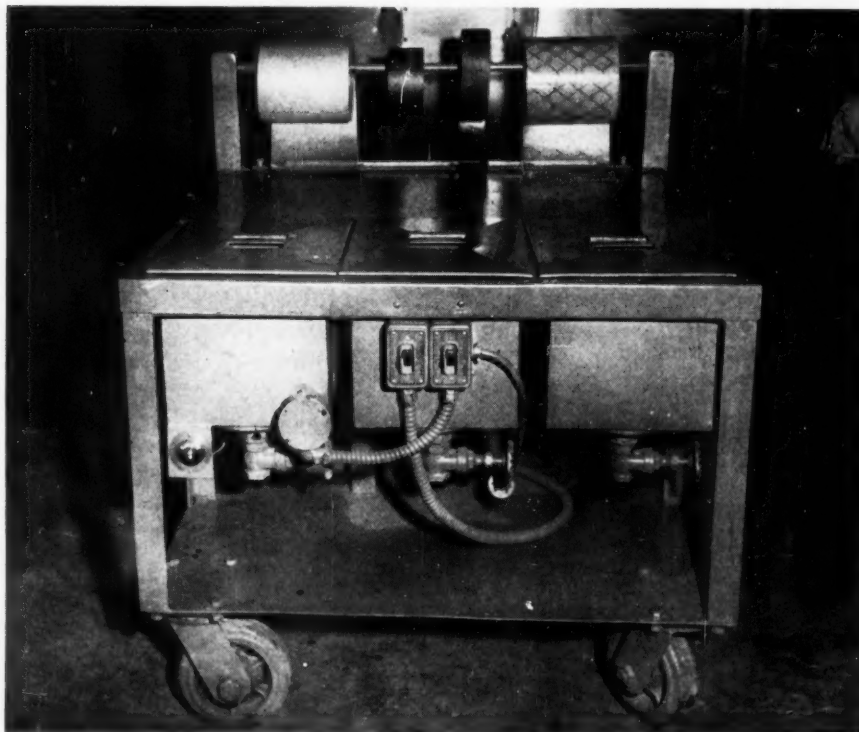


Fig. 1. A view of the Navy's new mobile repackaging and packing table for small parts. With the covers, the solvent, rust preventive solution and wax sealer are kept clean, and the top can be used for packing and wrapping operations.

The dust or coral sand, particles in the South Pacific atmosphere, which settles on bare metal or electroplated finishes, have a marked effect on corrosion acceleration for they hinder the formation of a continuous protective film on the finish or metals.

When corrosion oxide protective films (those which have not been washed off by tropical rains), crack under repeated cycles of stress, increased localized corrosion sets in, pits are formed, and the fatigue strength of the metal is reduced. Naturally protective coatings offer some protection against corrosion fatigue, but to what degree under South Pacific war conditions is a subject of wide difference of opinion.

Wooden containers, dunnage and the hygroscopic materials release moisture, organic acids, and other corrosive products, especially under South Pacific weather conditions of high humidity, heavy rains, intense heat, and atmospheres laden with sea water. Therefore the Navy has insisted that non-metallic, or non-corrosive, insulator material must be placed between the part, or piece of equipment, and the supporting structure at the points of contact for the purpose of preventing corrosion from electrolysis. The Navy has found that traces of corrosion residue always combine with moisture from humid atmospheres surrounding packing materials and intensify corrosion.

Obviously, corrosion preventives are practically worthless when applied to dirty surfaces. Buffing and grinding compounds; chemical and dust deposits; cutting and grinding compounds; fingerprint perspiration; general factory contaminations from boxes, tools, and machines; moisture; metallic residues from grinding, lapping, and machining; residual brazing fluxes, heat-treating salts, solder, and welding fluxes; and residues from etching solutions and marking inks set the forces of corrosion into action.

To prevent fingerprint moisture spots on parts the Navy has recommended that workmen use neoprene coated fabric gloves, or leather gloves. In fact, it recommends that parts should be handled in baskets, racks, or hooks, preferably of glass.

The Navy has found that corrosion is sometimes due to the wrong method of cleaning a part before it is finished, protective coated, or preserved.

Corrosion can even be caused by the improper application of solvent vapor degreasers on highly finished and polished parts with close tolerances because of the possible decomposition of chlorinated solvents in degreasers. For this reason the Navy recommends that after a part has been placed in a petroleum solvent bath it should be followed with a controlled application of neutral methanol solution which is water white and contains about 95 per cent anhydrous methanol.

Aluminum and magnesium and their alloys, zinc base die castings, and parts whose surfaces are partially covered with porcelain or paint should never be cleaned with alkali. In fact no cleaning material should be used on Navy war products before it is clearly determined that the cleaning solution will not chemically attack the product and that it will not leave irremovable residues.

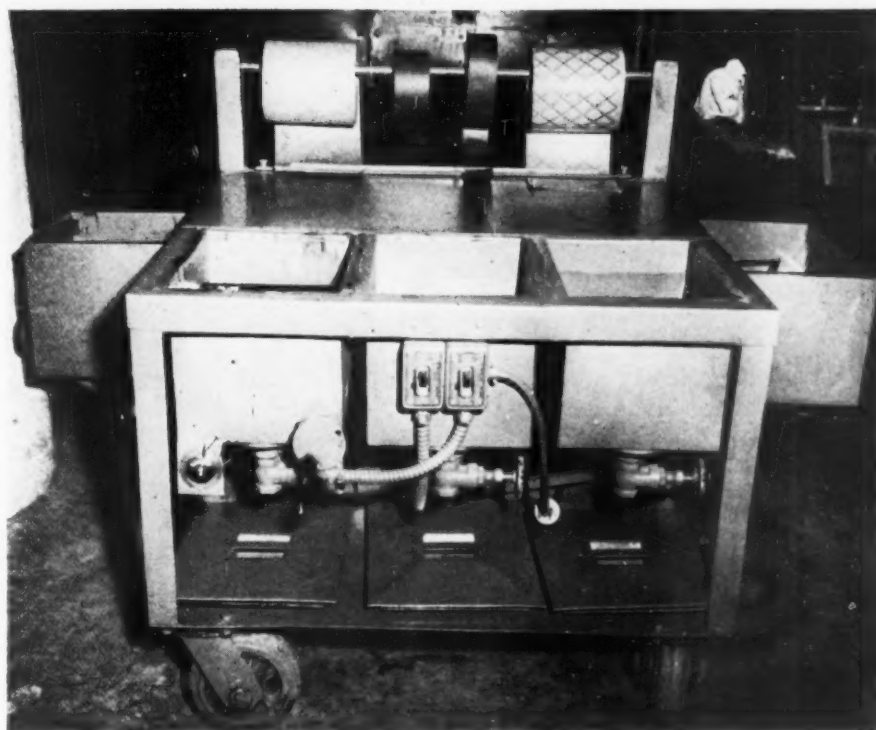


Fig. 2. Another view of the Navy's new mobile repainting and packing table for small parts. The solvent tank is on the right; the electric oven drier is in the center; and the rust preventive solution tank is on the extreme left; and a storage drawer is on the extreme right. Four grades of wrapping paper are mounted on the rod on the back of the table.

At the battle front the Navy is doing a lot of things to retard the rate of corrosion. For example, the Seabees and Marine Corps spray the engines of trucks, bulldozers, and tractors with Diesel oil every day; and every thirty days these engines are painted with zinc chromate as protection against salt water spray. Aluminum corrosion is cleaned with chromic acid. Then the part is rinsed. After it is dry the part is first sprayed with zinc chromate followed by a coat of paint.

When one realizes the amazing rate of corrosion which takes place on magnesium castings, steel aircraft propellers, water injectors, and a myriad of other things, especially when every minute lost for the want of a part to replace a corroded one may cost the lives of Americans, it behooves all to bend every effort to do their best to prevent corrosion in the shipment of equipment and parts to the Pacific war area.

In shipping parts from continental United States to a naval depot in the Pacific a large number of the same type of parts are sent in the same shipment. At a Pacific naval depot the shipment is broken out for inspection, repairs, represervation and shipment in small lots to the advance bases.

The first step in this procedure is the making of a shipment packing inspection report. This report deals with data on the shipment itself, on the materials shipped, on the shipping container, on the damaged condition of the materials, on the extent of corrosion, on the corrosion preventive methods used, and on the kinds of corrosion preventive materials used. And a photograph of the extent of corrosion always accompanies the report.

Damaged parts are repaired and corrosion films are removed before they are sent to

the repainting section of naval supply depot for shipment processing to an advanced base. To speed up operations in this processing the Navy recently built a few repainting and packing tables for the handling of small parts.

At these tables all parts are first properly cleaned in a Dearborn solvent; however, Stoddards solvent, naphtha, and carbon tetrachloride could be used, to free the parts of fingerprints, moisture, chemical fumes and other foreign matter such as metal chips, dirt, and shop coatings.

If the part cannot be dipped into the solvent tank of the table, it is hand cleaned either with a soft brush or with a clean cloth soaked in the solvent.

Next the parts are dried in an electric oven. This is an important operation because, if it is not properly done, corrosion may be caused by trapped pockets of water in the solvent or from other forms of improper drying.

After the parts have been properly dried they are dipped in one of three kinds of rust preventive grease compounds before they are wrapped in a series of grease-proof, non-corrosive papers to prevent the preservative from separating itself from the parts. This done, the entire package is then dipped for 5 to 10 seconds in liquid wax which is maintained at a temperature of 170° to 190° F. because if this wax sealer bath is below 170° the coat becomes too thick and when it is above 190° it produces a non-continuous film.

In applying preservatives to parts the Navy uses three methods. The first method is used to prevent contact of surfaces from dunnage, abrasion, impact, atmospheres, moisture vapors, and liquid water in shipping and



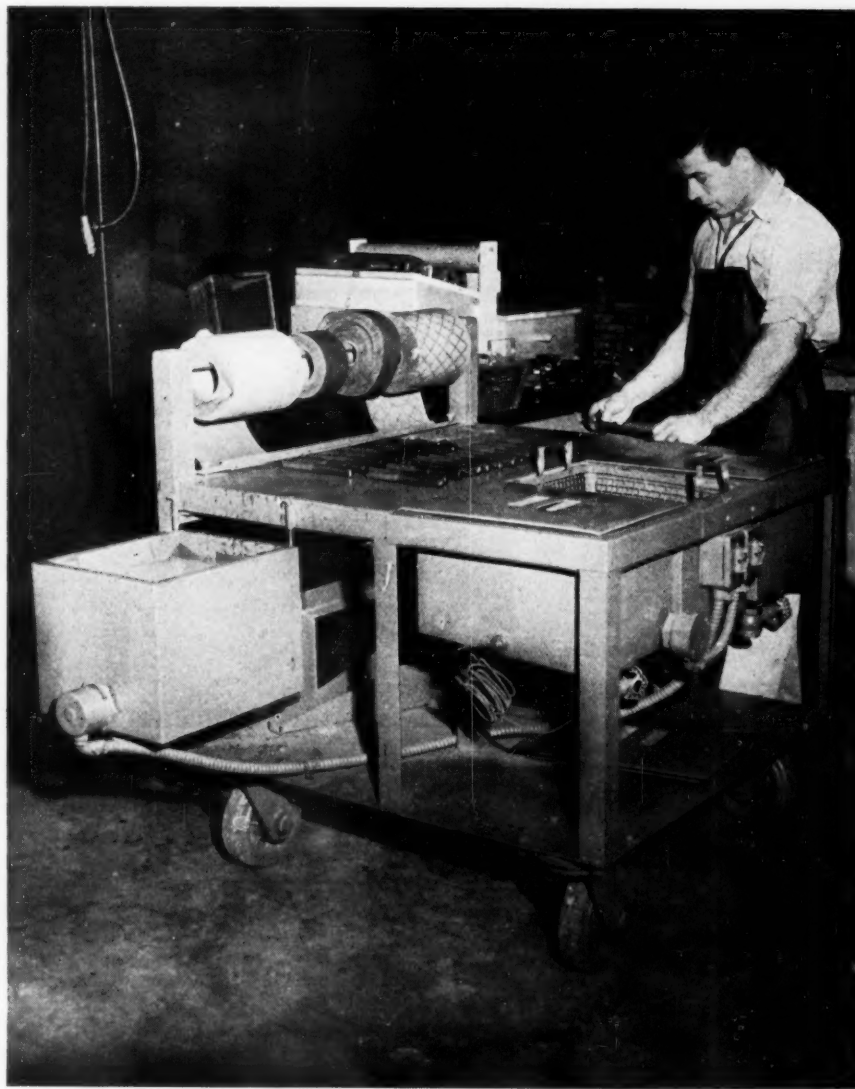


Fig. 3. Mobile represerving and packing table for small parts shown in use.

storing such items as hand tools, semi-finished castings, hooks, and tackle blocks.

The second method aims to protect such parts as precision hand tools, piston rings, gears, and valves against corrosion from moisture laden atmospheres, and to reduce the volume of air in the wrapping. In this method as in the other methods the grease-proof sides of the wrapping papers or bags are faced against the preservatives on the parts and assembly. The ends are heat sealed or pressure sealed. This wrapping is then overwrapped with another grade of paper.

The third method is one of sealing condenser coils, generators, carburetors, and engines with a dessicant. This method may be best understood by explaining the methods of preserving aircraft engines and parts.

Now, it is well recognized that water vapor or acid moisture from fingerprints sets into motion the agencies of corrosion on highly polished surfaces of precision parts of aircraft engines. In fact rust in excess of one-tenthousandth of an inch on these parts may cause serious damage and jeopardize safety in flight. And when one remembers that each cylinder of an aircraft engine may develop as many horsepower as twelve automobile cylinders, one can appreciate that this tre-

mendous strain may cause a rusted part to crack or fly to pieces in flight.

For this reason it is the task of the Aviation Representation and Minor Repair Shop of the ASA's Technical Division of a Naval Supply Depot to see to it that all airplane engines, highly polished parts and power units are free from moisture and properly protected.

First the engines are stripped of the factory's pliofilms—moisture proof barriers. The engines are then inspected for visible defects. If any are found they are immediately repaired.

After making this inspection, and necessary repairs, the factory's moisture absorbing silica gel crystals are removed and replaced with new crystals which are distributed throughout the engine before sealing. Two plugs of blue silica gel are placed in each cylinder to trap the moisture. A little later the plugs are checked. Those plugs which have turned pink are replaced with new ones. Then the bags of uncolored silica gel are hung around the exteriors of the engines.

This operation is followed by cleaning the pliofilm envelopes with a special solvent. But before the pliofilms are replaced the engines are wrapped in grizzly paper to keep

the sharp edges from cutting the pliofilm. After the engines are recovered with the pliofilms vacuum pumps remove the moisture filled air from the envelopes; and then the open ends are sealed together by using irons. The pliofilm envelopes, or coverings, are then carefully examined for defects. Even pin prick holes can be responsible for a lot of damage.

Power units and spare parts are treated with equal care to make them moisture proof to prevent corrosion. For example, the hubs and domes of three-bladed propellers are first cleaned in a solvent bath. This is followed by dipping them in a neutralizing solution to remove small amounts of acid from fingerprint perspiration. The blades are now ready to be coated with a black lignin preservative which is said to keep water and moisture vapors from corroding the blades. After that operation has been performed the blades are wrapped in light fuchsia colored paper, followed with coverings of heavier yellow and green papers which are free from moisture damaging acids. Then on top of those coverings another covering of water-proof paper is wrapped around the blades.

From the few observations presented in this article it can be gleaned that the Navy's problem of corrosion, or surrosion if you please, in the Central and South Pacific is a troublesome one.

It will require a lot of research to overcome the enemy of durability. The war has pointed out many phases of corrosion which were once little thought of. And since it is so important that the United States maintain a number of naval bases in the Pacific during the war, no time should be lost, therefore in conducting corrosion and surrosion research in the tropical regions of the Pacific.

Artificial climates manufactured in laboratories in the United States will not solve the Central and South Pacific corrosion problem for the reason that there are many variables in ocean water and climatic conditions which cannot be manufactured in a laboratory. Instead, the problem must be studied on the spot at various places in tropical Pacific.

Now it does not take one long to observe that the natives avoid using some things, but they have been confronted with a corrosion problem since the dawn of man. They may be illiterate, and perhaps a bit barbaric, but they are remarkably practical when it comes to dealing with the elements of nature. Some of them treasure secrets about corrosion prevention which would be beneficial to know. For example, it is interesting to observe how they hang tools to reduce corrosion to a minimum. Some of them know where to find a certain flower with miraculous dehydration powers for it prevents tools from corroding when placed in a tool box.

To learn some of these secrets many years of research, tremendous patience, and ample funds will be necessary, to carry on the investigation. Yes, it would be well to find out what the natives know about fibers, resins, pigments, dessicants, and even the use of coconut palm trees. Our scientists should build on this information in their efforts to solve the corrosion and surrosion problems of the Central and South Pacific for the benefits it will bring to industry and to the United States Navy.

# Wearing Qualities of Gold Deposits

## Good Lacquer Superior to Heavier Gold Deposits

By GEORGE B. HOGABOOM

*Consultant, New Britain, Conn.*

THE requirement for heavy gold deposits for both wear and ornamentation has brought about a practically new development in the electroplating industry. The coatings on ornamental objects which are subjected to little wear, e. g., costume jewelry, are quite thin. The operators doing the plating are called in most cases "colorers" rather than electroplaters. This term was well applied as the articles received a coating of gold just sufficient to give it a color. The color varied according to the style in vogue and seldom was the rich yellow of pure gold. The deposit of gold is so thin and the time consumed in plating is so short that it is not possible to use ammeters to any extent. The "coloring" is done in seconds, in some plants the colorer is instructed to count 10 and plate no longer. While a "fair" coating of gold can be applied on a single article in 10 seconds, the general practice is to handle several wires or "strings," on which there are a number of articles. The area of the batch of pieces or the current density used, as employed in the electrodeposition of base metals, is given no consideration. If the correct color is not obtained in the stated time, which always varies according to the vagaries of the colorer, the bunch of wired articles is shaken vigorously so as to rearrange the pieces and a second coloring applied.

The volume of the gold solution used is small and the metal concentration is seldom above 5 pennyweight per gallon. As a rule insoluble anodes are used. When the color is "off" more gold metal as cyanide or fulminate is added, not in a definite quantity, but according to what each colorer has found to be "right" from experience. When a solution does not respond to the addition of metal in an unknown quantity of sodium or potassium cyanide or some phosphate salt is added. If the solution acts arbitrary and does not produce the correct color then it is discarded and replaced with a new solution.

There are, of course, exceptions to this method of depositing gold but these are so few that they can be counted on the fingers, perhaps of both hands. In those plants where church goods, musical instruments or safety razors and similar articles are gold plated there is a semblance of control methods. The thickness of the gold deposit is heavier than that used on costume jewelry but not very much heavier. What is considered a "real heavy" gold plate even on articles that receive considerable wear is seldom, if ever, more than 0.0001 inch thick and more probably less.

In the deposition of nickel, copper or brass, a coating 25 per cent heavier than specified is considered good practice as a safety factor. Gold, however, due to its price, must be more closely controlled, as, from a sales point, the article will stand only a certain cost and is therefore limited as to thickness or weight deposited.

The wearing properties of thin gold coatings are remarkable. A piece of costume jewelry is discarded because it is out of style and not because the gold coating has worn off. A safety razor that is used daily holds the color and shows no sign of wear for a very long period of time, in fact, years, if reasonable care is used in rinsing and drying well after each time it is used. Costume jewelry may be lacquered, which will protect the gold for a long time, but safety razors are not lacquered. The gold on the safety razor is heavier but not so very much. Before the value of gold was increased, one type of safety razor that had considerable surface area received a coating of gold the cost of which was 7 cents and that coating gave wear.

There is no gold plated article that receives more severe wear than milady's vanity case or compact. It is carried in a purse with coins, keys and sundry other articles. When something other than the vanity case is wanted the case is pushed around with no thought of the effect of the treatment on the finish it received when new. It stands this abuse so well, however, that often refills of compacts are used provided the style of another case has not proved more attractive. The cost, however, of the gold plated on the average vanity case never exceeds 3 cents and often is less. Gold plating 3-inch cases is recalled at a cost for gold of \$20 per 1,000 which included the gold in the "drag-out" of the plating solution. The wearing life is not due to the coating of gold but rather to the quality and hardness of the film of lacquer subsequently applied.

In some existing specifications for the thickness of gold on medallions, medals and similar articles, a deposit of 0.0002" is required, a thickness of gold never put on the gold plated buttons for uniforms. The same specifications may also call for a coating of lacquer.

It became a matter of interest to learn, if possible, why such a heavy coating of gold is required on articles that receive so little wear. The reason for this interest was the difficulty many colorers had in meeting the specifications.

Heavy gold plating to a required thickness cannot be produced in the same manner as coloring. To electroplate any metal to a given thickness it is necessary to know the area of the work, the permissible current density that can be used and the time of plating. The articles cannot be "strung" on wires and plated in bunches. The metal concentration of the plating solution must be more than that used for coloring solutions. The ratio of metal to the chemical salts must be kept within reasonable limits. In other words the gold plating solution must be controlled in the same manner as is the general practice in the operation of other plating solutions. Soluble anodes that will maintain the metal concentration of the solution must be used. Insoluble anodes will soon cause a depletion of metal, a consequent change in metal—chemicals ratio with resulting change in cathode efficiency, or in other words, the amount of metal deposited on a known area of work by a definite number of amperes for a stated period of time. If the solution is not kept up to a standard then there will be rejections of work due to too light a coating of gold. If the articles being plated are not well spaced so that some of them will be in the path of high local current density, a uniform coating of gold cannot be obtained on all of the pieces. If the current conditions are not known and carefully controlled it is not possible to produce work that will meet specifications.

Ampere-hour meters, recording ammeters or those in which the dials indicate the weight of metal deposited are of little value, as they indicate only the total amount of metal deposited on the total batch of work and do not indicate the amount of metal on any one piece. One or more articles can, and often do, receive up to 50 per cent more deposit than other articles due to shadowing, poor contact and distance from anode. The ammeter may indicate that a certain weight of metal has been deposited but it does not indicate where the metal was deposited, on what piece or on what part of any piece. Specifications require that all the articles must have a certain thickness of coating and that the deposit must be uniform in thickness within reasonable limits.

A lacquer coating on gold plated articles will increase the wear-life of an article provided the correct quality of lacquer is used. Specifications for lacquer should be for resistance to wear rather than the amount of solids in the lacquer that is used. A thin deposit of gold, coated with a lacquer that

has good wear resistance will give far longer service than a heavy deposit of gold and a coating of inferior lacquer. The wearing properties of a medal or medallion can be increased more by the application of a good resistant lacquer than by an increase in the thickness of the gold plate. If the resisting properties of the lacquer coating was specified the colorer can produce serviceable articles, and rejections for lack of a definite thickness of gold plate would be negligible.

The proof of the above was determined by tests made on three different thicknesses of gold deposits on brass and by tests made with two different grades of lacquer on the Taber Abraser.

#### Gold

Thickness	Milligrams loss per 1,000 cycles
0.00016"	62
0.00007"	57
0.00001"	43

#### Lacquer Coating Only

0.001"	25—No. 1
0.001"	57—No. 2

#### Method of Determination

1. No. 10 Calibrase wheels.
2. 1,000 gram weights on each wheel.

3. Wheels refaced (20 cycles) after each 200 cycles of wear.
4. Abrasion measured in cycles per mill (dry) of coating.
5. Abrasion in milligram loss per 1,000 cycles of wear.

From the data obtained in these tests it is indicated that heavy coatings of gold are softer than light deposits. Also that a good lacquer has twice the wear-life of a poor lacquer. Both lacquers were air dried. A deposit of 0.00001" of gold with a coating of a good wear resistant lacquer has a greater service life than a heavy gold deposit on which a poor grade of lacquer has been applied.

## ELECTRODEPOSITION OF SILVER AND COPPER FROM THEIR SIMPLEST SALTS

**E**LECTRODEPOSITION of silver or copper from solutions of their complex salts, e.g., from sodium silver oxalate or potassium silver cyanide, often is not very convenient because of sensitivity of the solutions to impurities, of health hazard, and similar reasons; but it is used everywhere since the deposits obtained from such solutions are less porous and adhere better than those from simple salt solutions.

The problem of why complex salts give rise to better electrodeposits than simple salts do, has been debated for years in the scientific and technical literature.\*\* One view was that complex ions were partly dissociated into simple ions so that, say, a solution of potassium silver cyanide contained a small concentration of silver ions. Another variant of the same idea was that some of the, say, silver cyanide anions  $[\text{Ag}(\text{CN})_2]$  present in the solution were in a labile state from which they dissociated in an external electric field. From both these points of view the complex salt represents a large reservoir of metal ions the concentration of which is kept permanently constant and low.

The low value of the concentration affects the electrodeposits in the following way. The grain size of the deposit is small if the nuclei of crystallization on the metal surface grow slowly so that as many nuclei as possible have opportunity to expand into crystals; when the crystal growth is rapid, one crystal invades the area of many present and potential nuclei, and the grains are large. Since smaller grains form better deposits, the rate of crystal growth should be small. That is achieved by keeping the con-

centration of metal ions so low that at any given time only relatively few ions are discharged on the surface of the deposit.

The constancy of the ionic concentration takes care of the constancy of the grain size and other properties across the whole thickness of the electrodeposited film.

If this view is correct it ought to be possible to obtain satisfactory electrodeposits also from solutions of simple salts if these solutions are sufficiently dilute and their concentration is kept sufficiently constant. Experiments by A. Levin\* showed the truth of this conclusion.

A vessel shown in the accompanying figure has been used. The electrolyte flowed between the plane parallel electrodes 1, left

the vessel through the outlet 2 and was continuously recirculated. In addition it was agitated by the stirrer 3. The electrodes were of platinum, had an area of 4 sq. cm. (0.64 sq. in.) and spaced 1 cm. (0.4 inch) apart. The capacity of the vessel was 200 cc. and the liquid was renewed by circulation every 50 sec. The voltage at the terminals was 25 volts.

**TABLE I**  
**Silver Nitrate**

Normality	$5 \times 10^{-6}$	$5 \times 10^{-7}$	$4 \times 10^{-7}$	$4 \times 10^{-8}$
E.m.f.	0.267	0.302	0.370	0.404 volts

**Copper Sulfate**

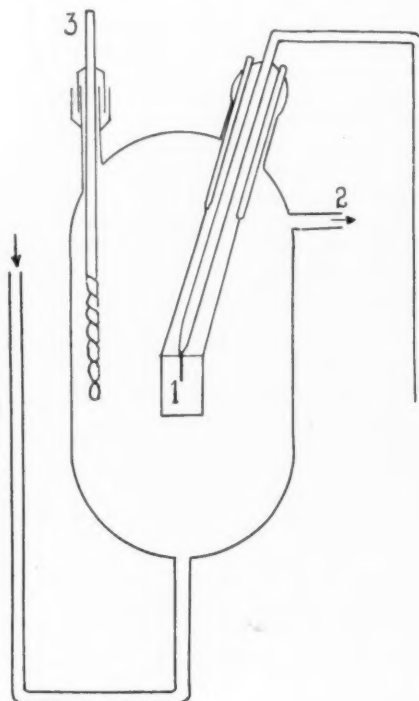
Molarity	$10^{-7}$	$10^{-9}$	$2.5 \times 10^{-12}$
E.m.f.	0.132	0.190	0.269 volts

The solutions used are listed in Table I which includes also the potential differences between silver and copper electrodes in these solutions and in 0.01 N silver nitrate or 0.1 M copper sulfate. For comparison, the corresponding potential differences for sodium silver oxalate and potassium silver iodide are 0.337 and 0.846 volts, and those for sodium copper oxalate and ammonium cuprous rhodanide are 0.147 and 0.631 volts.

In these solutions a cathodic current density of 0.2 to 2 milliamperes per sq. cm. (i.e. 0.2—2 amp. per sq. foot) could be realized.

At the lower current densities the deposits were microcrystalline, so well adherent that they did not flake off when the cathode was bent, and generally quite similar to those obtained from complex salt solutions. However, the current yield was low, only 15—30%.

The view that complex salt solutions are just reservoirs of simple ions is confirmed also by the behavior of the polarization of cathodes in the course of electrodeposition: this behavior can quantitatively be accounted for by assuming the polarization to be due to consumption of ions near the cathode. No detailed report can be given here on this part of Levin's work.



\*A. Levin, *Russian J. Phys. Chem.*, **18**, 53 (1944).

\*\*See, for instance, F. Haber, *Ztsch. f. Elektrochemie*, **10**, 433, 773 (1904). W. Blum and H. S. Rowden, *Trans. Amer. Electrochem. Soc.*, **44**, 397 (1923). L. B. Hunt, *J. Phys. Chem.*, **36**, 1006, 2259 (1932).



# Master Metal Finishers Association of New England, Inc.



**Rosario A. Campisi**  
President



**Colgate Gilbert**  
Vice-President



**Louis Tosi**  
Treasurer

**A** MASSACHUSETTS charter was issued on March 9, 1945 to the recently organized *Master Metal Finishers Association of New England, Inc.* which has established its office in the Boston Chamber of Commerce Building, 80 Federal St., Boston.

Officers elected on May 22, 1945 are as follows:

Rosario A. Campisi of Industrial Enameling Corp., Boston, Mass., was elected president; Colgate Gilbert of Gilbert Associates, Inc., Walpole, N. H., was elected vice-president; Louis Tosi of Cambridge Plating Co., Cambridge, Mass., was elected treasurer, and Robert L. Smith of Tuttle Plating Co., Boston, Mass., was elected clerk.

## Executive Committee

Ernest D. Callahan of F. M. Callahan & Sons, Malden, Mass.; James F. Campbell of Boston Nickel Plating Co., Boston, Mass.; Robert A. Evans of New Method Plating Co., Providence, R. I.; William H. Harney of Tremont-Old Colony Plating Co., South Boston, Mass.; Pierre B. Lonsbury of Walton & Lonsbury, Attleboro, Mass.; Harry M. Saltzberg of Modern Electro Plating Co., Boston, Mass., and Joseph E. Thompson of Southern New England Electroplating Co., Oakville, Conn.

Other firms represented in the membership are:

A. A. Brunell Electroplating Corp., Worcester, Mass.; City Plating Co., Providence, R. I.; Engineering Products & Specialties Co., Pawtucket, R. I.; Franklin Electro Plating Co., Dover, N. H.; Globe Nickel Plating Co., Charlestown, Mass.; Haverhill Plating Co., Haverhill, Mass.; Oscar A. Hillman &

Sons, North Attleboro, Mass.; Hub Barrel Plating Co., Boston, Mass.; International Stencil & Finishing Co., Pawtucket, R. I.; North Star Plating Works, Everett, Mass.; Nye's JapEnamelac Shop, Cambridge, Mass.; Richard I. Reid, Cranston, R. I.; Royal Plating Works, Boston, Mass.; R. Henry Smith Associates, Allston, Mass.; The Plating Shop, Somerville, Mass.; Waterbury Plating Co., Waterbury, Conn., and Worcester Brass & Electric Plating Co., Worcester, Mass.

The Association has been active during the past few months in assisting the Office of Price Administration in the preparation of OPA Regulation 581. Several open meetings for the entire industry in New England have been held at the Hotel Statler with Boston Regional OPA Officials present to clarify the provisions of this Price Controlling Regulation. Mr. Campisi and Mr. Gilbert, with several other members of the group, have visited New York, Chicago, Indianapolis, and other cities to obtain all available information that might be of help to New England Metal Finishers.

Walter R. Guild, a professional trade association Manager, was employed on April 2, 1945 to serve as Managing Director. Mr. Guild is also Managing Director of the following associations:

New England Manufacturing Confectioners Association, Massachusetts Warehousemen's Association, Federal Emergency Warehouse Association of Boston, New England Paper Merchants Association and the Cigarette Merchandisers Association of Massachusetts. On June 11th he was elected President of the Boston Trade Association Executives.



**Robert L. Smith**  
Clerk



**Walter R. Guild**  
Managing Director

# Analysis of Hydrofluoric-Nitric Acid Stainless Steel Pickling Bath

By WILLIAM E. McKEE and WILLIAM F. HAMILTON<sup>1</sup>

Engineering Research Laboratory, Chemical Division, Lockheed Aircraft Corporation, Burbank, Calif.

The economical and efficient operation of the hydrofluoric-nitric acid stainless steel pickling bath requires control by chemical analysis. In this paper rapid quantitative analytical procedures are presented for the analysis of the bath. They include the determination of total acidity, iron, fluoride, and nitrate.

THE nitric-hydrofluoric acid pickle bath is used in cleaning the siliceous welding flux residue and scale from stainless steel parts after welding or annealing. The solution when originally made up contains approximately 1% anhydrous hydrofluoric acid and 12% anhydrous nitric acid by weight. These concentrations vary as the bath is replenished.

Since satisfactory analytical procedures were not available, control had consisted of adding hydrofluoric acid and nitric acid in the ratio of 1 to 10 parts by weight, respectively, to produce the desired pickling rate. The need for a rapid control analysis to determine both the factors influencing the efficiency of the bath and the concentrations of the components was obvious because of the erratic performance of the bath. Unnecessary additions and tank drainings can be eliminated if these factors are known. In the course of this investigation, it was found that proper control of the bath required the determination of total acid, as well as the iron, fluoride, and nitrate ions (4).

## Discussion

The separate quantitative determination of nitric and hydrofluoric acids by direct alkali titration is prevented by the accumulation of siliceous materials from the welding flux as

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well as iron, chromium, and nickel from the dissolved steel. In hydrofluoric acid, iron, chromium, and nickel form weak acids of the types  $H_3MF_6$  and  $H_2FM_6$  (5), where M = Fe, Cr, or Ni. During the neutralization of these compounds, metallic hydroxides are precipitated. Ferric hydroxide starts to precipitate at about pH 4; chromium and nickel precipitate at slightly higher pH values. At pH 8, practically all of the iron and most of the chromium and nickel are precipitated. The nitric and hydrofluoric acids, as well as weak acids, are also completely neutralized at this pH value.

The total acidity can be arbitrarily considered as the sum of all acidic constituents which are titrated by an alkali to a pH of 8. The titration must be corrected for the amount consumed in precipitating the metallic ions as hydroxides. It is expressed as equivalents of acid per 100 ml. of sample. Since titration curves show that in hydrofluoric-nitric acid solutions of these metals the greatest inflection occurs at pH 8, it is possible to titrate to this pH, thus neutralizing all strong and weak acids, and to calculate their concentrations by applying a correction factor for the alkali used by the metals. This factor is obtained by separating the hydroxides and measuring the volume of the precipitate in graduated centrifuge cones under definite conditions.

When similar conditions of acidity and identical conditions of centrifuging are maintained, a satisfactory constant relation is obtained between the volume of the precipitate and the amount of base required to produce the precipitate, even though the concentrations of iron, chromium, and nickel ions vary over a wide range. In practice, the amount of dissolved iron is always several times greater than that of the chromium and nickel.

A number of quantitative procedures are available for the determination of fluorides.

They include precipitation methods using calcium fluoride, lead chlorofluoride (8), triphenyltin fluoride (2); the titration of evolved silicon tetrafluoride with alkali (6); and various colorimetric methods. In general, they are not practical for the control analysis of the pickle bath, because large quantities of iron and other metals in solution result in interference.

A slightly modified form of the Rowley-Churchill determination was found to be rapid and satisfactory (7). Fluorides are separated from the interfering metals by distillation as fluosilicic acid and titrated in a buffered solution with thorium nitrate using Alizarine Red S as an indicator. Nitric acid does not interfere.

The dissolved iron is present entirely in the ferric state. In the presence of chromium and nickel it may be determined by any one of several gravimetric procedures. In the following rapid method, the iron is estimated in graduated centrifuge cones by comparing the volume of ferric hydroxide precipitated from an aliquot of the pickle solution with that from known samples. The standard must be precipitated from a nitric acid solution containing fluorides, but the quantities present are not critical. An excess of sodium hydroxide and ammonia dissolves the bulk nickel and chromic hydroxides which coprecipitate with the ferric hydroxide. To obtain accurate results, the pickle solution and standard must be precipitated and centrifuged in a similar manner.

The nitrate-ion concentration is conveniently determined by the ferrous sulfate method of Bowman and Scott (3), which applies to nitrate determination in concentrated arsenic, phosphoric, or sulfuric acid. For the analysis of the pickle solution, the most consistent results were obtained by titrating the nitrate ion in concentrated sulfuric acid. Fluorides, trivalent chromium, nickel, and iron do not interfere.

Table I. Determination of Total Acidity in Known Samples

Experiment No.	Total Acid Added, Equivalents per 100 ml.	Total Acid Found, Equivalents per 100 ml.	Difference, Equivalents per 100 ml.	Difference, %
1	0.154	0.149	-0.005	-3.2
2	0.154	0.150	-0.004	-2.6
3	0.215	0.219	+0.004	+1.9
4	0.215	0.216	+0.001	+0.46
5	0.215	0.205	-0.010	-4.7
6	0.277	0.268	-0.009	-3.2
7	0.277	0.283	+0.006	+2.2
8	0.307	0.314	+0.007	+2.3

Table II. Determination of Total Fluoride in Known Samples

Experiment No.	Total Fluoride Added, G./100 ml.	Total Fluoride Found, G./100 ml.	Difference, G./100 ml.	%
1	0.905	0.902	-0.003	-0.33
2	0.905	0.925	+0.02	+2.2
3	1.36	1.33	-0.03	-2.2
4	1.36	1.39	+0.03	+2.2
5	1.42	1.46	+0.04	+2.8
6	1.81	1.85	+0.04	+2.2
7	2.72	2.67	-0.05	-1.9
8	2.84	2.89	+0.05	+1.8

Table III. Determination of Nitrate in Known Samples

Experiment No.	Nitrate Added G./100 ml.	Nitrate Found G./100 ml.	Difference G./100 ml.	%
1	3.72	3.74	+0.02	+0.56
2	9.33	9.23	-0.10	-1.1
3	9.53	9.53	0.00	0.0
4	11.2	11.1	-0.1	-0.89
5	13.1	12.7	-0.4	-3.6
6	15.3	15.2	-0.1	-0.65
7	16.8	16.8	0.0	0.0
8	19.1	18.9	-0.2	-1.0

### Reagents Required

Standardized base, 0.5 N sodium hydroxide.  
Standardized nitric acid, 1.5 N.  
Standard sodium fluoride, 0.750 N. Dry sodium fluoride for 2 hours at 110° to C., dissolve 3.150 grams of the dry salt in distilled water, and dilute to exactly 100 ml.  
Stock stainless steel solution, 130 grams of ferric nitrate nonahydrate, 35 grams of chromic nitrate nonahydrate, and 16 grams of nickel nitrate hexahydrate in 1 liter of distilled water.  
Buffer solution, 9.4 grams of monochloroacetic acid and 2.0 grams of sodium hydroxide in 100 ml. of distilled water.  
Indicator, 0.5 gram of Alizarine Red S (sodium alizarin sulfonate) in 100 ml. of distilled water.  
Standardized thorium nitrate, 0.07 N. Dissolve 9.2 grams of c.p. thorium nitrate tetrahydrate in 1000 ml. of distilled water and standardize against standard sodium fluoride.  
Standard iron solution, 0.010 gram per ml. Dissolve 1.00 gram of pure iron wire in 25 ml. of 6 N nitric acid, boil a few moments, and dilute to exactly 100 ml.

### Procedure

**TOTAL ACIDITY. Correction Factor.** The correction factor for metallic impurities is determined as follows:

A solution of 10.0 ml. of standard sodium fluoride and 10.0 ml. of standard nitric acid is added to approximately 20 ml. of water and titrated to a pH of 8.0 with the aid of a pH meter. A solution of 10.0 ml. of standard sodium fluoride, 10.0 ml. of standard nitric acid, and 5.0 ml. of stock stainless steel solution are added to approximately 100 ml. of water and the mixture is titrated to a pH of 8.0. The titration should be made very near the end point. If the final volume exceeds 100 ml., the precipitate is allowed to settle and some of the supernatant liquid is poured off. The precipitate is then stirred into the remaining liquid and the suspension is distributed between two graduated 50-ml. centrifuge cones. The cones are filled to the 50-ml. mark, balanced by adding water, and centrifuged for at least 3 minutes. The time interval during centrifuging is accurately noted. The total volume of precipitate in the two cones is recorded.

The correction factor for metallic impurities is calculated as follows:

$B$  = ml. of base to titrate 10.0 ml. of stand-

ard sodium fluoride, 10.0 ml. of standard nitric acid, and 5.0 ml. of stainless steel solution

$B$  = ml. of base to titrate 10.0 ml. of standard sodium fluoride and 10.0 ml. of standard nitric acid

$C$  = ml. of hydroxide precipitate

$W$  = correction factor or ml. of base per ml. of precipitate

$$W = \frac{A - B}{C}$$

**Total Acidity Determination.** An aliquot of 5.0 ml. of pickling solution is added to approximately 35 ml. of water and titrated to a pH of 8.0. The amount of precipitate is determined as indicated above, using the same centrifuging time and speed. The total acidity is calculated as follows:

$D$  = ml. of base required to titrate 5.0 ml. of sample

$E$  = ml. of hydroxides precipitated from 5.0 ml. of sample

$W$  = correction factor

$N$  = normality of base

$X$  = total acidity as equivalents of acid per 100 ml. of pickle solution

$$X = \frac{[D - EW]N}{50} = \text{total acidity}$$

**IRON CONTENT.** Any standard gravimetric method for the determination of iron in the presence of chromium and nickel may be used. However, the following rapid method is recommended.

**Standardization.** From 1.0 to 10.0 ml. of standard ferric iron solution are added to a solution of about 5.0 ml. of standard sodium fluoride and 5.0 ml. of standard nitric acid and diluted to about 40 ml. The solution is titrated to a pH of 8.0, 20 ml. of concentrated ammonia and 4 grams of sodium hydroxide are added, and the suspension is stirred until the sodium hydroxide has dissolved. The precipitate is centrifuged and measured under exactly the same conditions as used for the unknown sample. The volume-weight relation is found from the observed volume of the precipitated ferric hydroxide and the grams of iron required to produce it.

**Determination.** A 5.0 ml. portion of sample is added to approximately 35 ml. of water and titrated to a pH of 8.0; 20 ml. of concentrated ammonia and 4 grams of sodium hydroxide are added, and stirred until the sodium hydroxide has been dissolved.

The suspension of hydroxides is centrifuged in graduated cones as in the total acidity procedure. The volume of precipitate is meas-

Table IV. Comparison of Iron Determinations by Gravimetric and Present Methods

Experiment No.	Gravimetric Method G./100 ml.	Present Rapid Method G./100 ml.	Difference G./100 ml.	%
1	0.925	0.931	+0.006	+0.65
2	1.10	1.20	+0.10	+9.1
3	1.20	1.19	-0.01	-0.83
4	1.33	1.28	-0.05	-3.8
5	1.12	1.14	+0.02	+1.8
6	1.31	1.39	+0.08	+6.1
7	2.19	2.29	+0.10	+4.6
8	3.50	3.33	-0.17	-4.9

ured and compared with a standard prepared from the standard iron solution. For most accurate results, equal amounts of precipitate should be used in comparing known amounts of iron, as against unknown amounts of pickle solution.

The iron content is calculated as follows:  
 $G$  = grams of iron taken for standardization

$H$  = ml. of precipitate obtained from known amount of iron taken for standardization

$J$  = ml. of precipitate from 5.0 ml. of sample  
 $Y$  = grams of ferric iron per 100 ml. of sample

$$Y = \frac{20GJ}{H}$$

**NITRATE DETERMINATION.** A 2.0-ml. portion of sample is delivered beneath the surface of 100 ml. of nitrate-free concentrated sulfuric acid. The concentrated sulfuric acid should be stirred while the sample is being delivered. The grams of nitrate ion per 100 ml. of pickle solution are calculated from the ferrous sulfate consumed. Bowman and Scotts' correction factor is also applied.

**TOTAL FLUORIDE CONTENT.** A 125-ml. distilling flask connected to a water-cooled condenser is fitted with a two-hole rubber stopper; a thermometer is extended down into the liquid and a dropping funnel arranged so that water can be added during the distillation. The distillate is conveniently collected in a 100-ml. volumetric flask.

A few glass beads and approximately 0.1 gram of sodium silicate are placed in the distilling flask, and 6 ml. of 70% perchloric acid and 20 ml. of water are added. A 2.0-ml. sample is carefully pipetted into the flask. The distilling flask is heated, and the temperature of boiling solution is maintained at 115° to 125° C. by careful addition of water from the dropping funnel. The temperature should finally be allowed to reach 140° C. Approximately 60 to 75 ml. of distillate are collected in a 100-ml. flask and diluted to the mark with water. Once or twice during the distillation, the burner should be removed and the thermometer and stopper washed down with water. After the distillation is completed, any condensate is washed from the flask's arm and condenser into the volumetric flask and diluted to volume with distilled water.

A 25-ml. aliquot of the distillate is pipetted into a tall beaker and diluted to 100 ml. and

(Concluded on page 339)



# THE FUTURE OF ELECTROPLATING

By DR. C. B. F. YOUNG

*Consultant and Head, Institute of Electro-Chemistry & Metallurgy, New York, N. Y.*

**B**ETWEEN arguments these days of when the Japanese war will end and what the meat shortage is due to, electroplaters are generally discussing the future of electroplating and what plastics will do to the metal finishing field and what they can do to make a good job for themselves when the war is over. What about the future of the electroplating industry? Is there a future in it? Can it stand on its own? I, for one, sincerely believe that the answers to the above are all very positive. Let us examine the industry and the men working in it. If this article makes you mad, get out and do something about it. Don't sulk! One other point, the author is not talking about an individual but is speaking of the industry as a whole. Please bear this in mind.

Electroplating has its good points and it also has its bad ones. Up to the present many electroplaters and many more manufacturers have been trying to make a "killing" or get in business by capitalizing on the faults. If this method of protecting metals from corrosion, abrasion, etc., and the method of making metallic objects more pleasing to the eye is considered fair practice, this practice must stop.

What are these practices? Generally speaking they are methods used to fool the customer. Remember the old saying "You can

fool some of the people some of the time, but you can't fool all the people all the time." Fooling the people has been a great game of unscrupulous manufacturers and electroplaters. This is due to the nature of electroplating. If one produces a mechanical coating of a gold alloy on, for instance, nickel silver, he starts with a thick billet say two inches square. On top of this is placed the gold alloy which is, for instance, one-quarter-inch thick. These pieces are rolled down until the bond between them is very secure. It should be emphasized that the thinner the gold alloy plate, the more times it must be put through the rolls. Therefore, the thinner the alloy plate, the higher the cost per unit thickness. In electroplating the reverse is true because the electroplater instead of starting with a thick gold alloy, starts with a coating of zero thickness. The thicker the plate desired, the longer the piece must be left in the bath. Be sure to compare the two for they are important.

It is easier and cheaper to cheat the customer by the electroplating method than by the roll method. This definitely is a fault of plating considered from this angle. However, this can be turned into an advantage by the man who is looking for new ways and new methods at a cheaper cost. For

thin deposits there is no method as cheap as electroplating. This is an interesting field for exploration and development.

Another fault of plating is that the deposits are porous. This exposes the base plate and invites corrosion, etc. It should be emphasized that deposits containing the smallest number of pores per square inch have been produced by electroplating methods.

Poor throwing power dogs the electroplater. This can be improved by using proper bath, for instance, a phosphate cyanide bath instead of a sulphate or by expert racking of the work and using specially designed anodes.

Poor adhesion is similarly responsible for criticism and rightly so. (However, any good electroplater knows how to take care of such by the proper cleaning, checking the plating bath, etc.) It is only due to carelessness or incompetence that such work ever reaches the market.

Last, sometimes the wrong coating is used. Thus zinc is substituted for cadmium or chromium. Gold is diluted with copper. Nickel is substituted for chromium and so on. This is due to two reasons.

1. Ignorance.
2. Cutting Costs.

Both of these are unnecessary, and when they cause a substitution, trouble results.

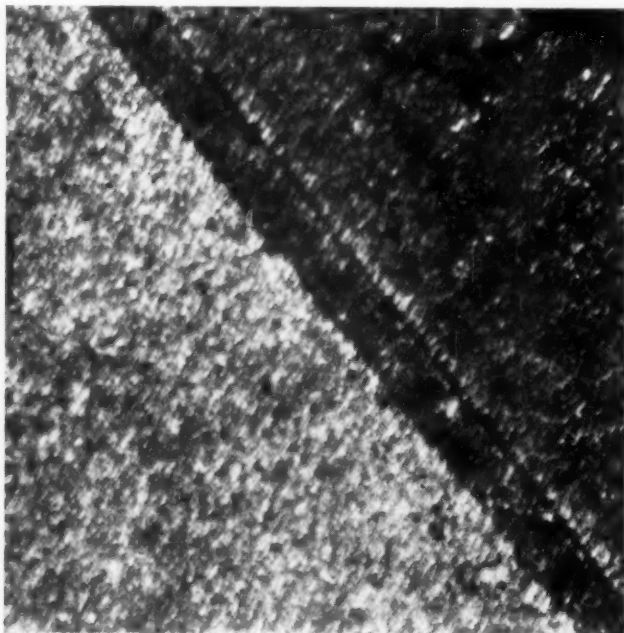


Fig. 1. Outside of spoon  
Silver 0.0004" thick.

x 500

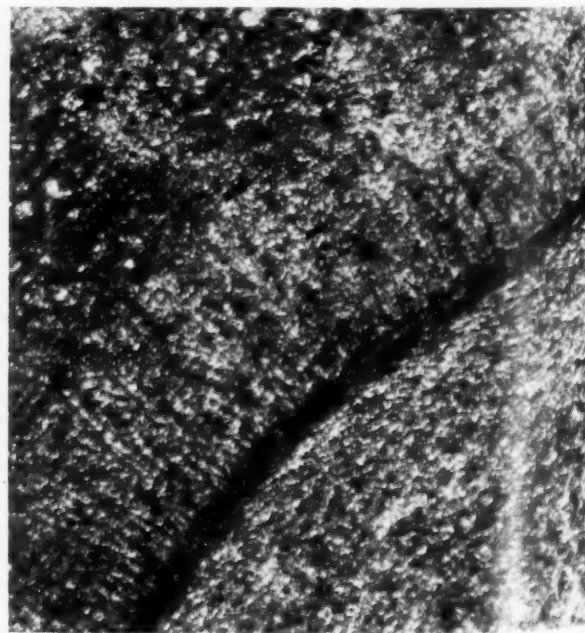


Fig. 2. Handle of spoon  
Silver 0.00014" thick.

x 500

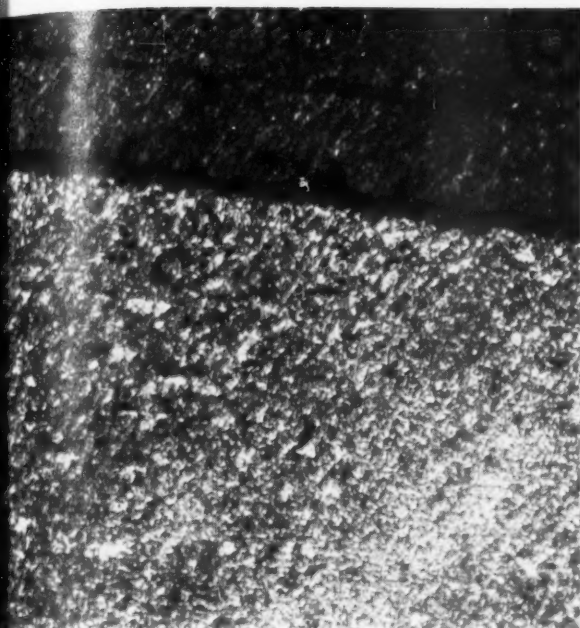


Fig. 3. Inside of spoon  
Silver 0.00008" thick.

x 500

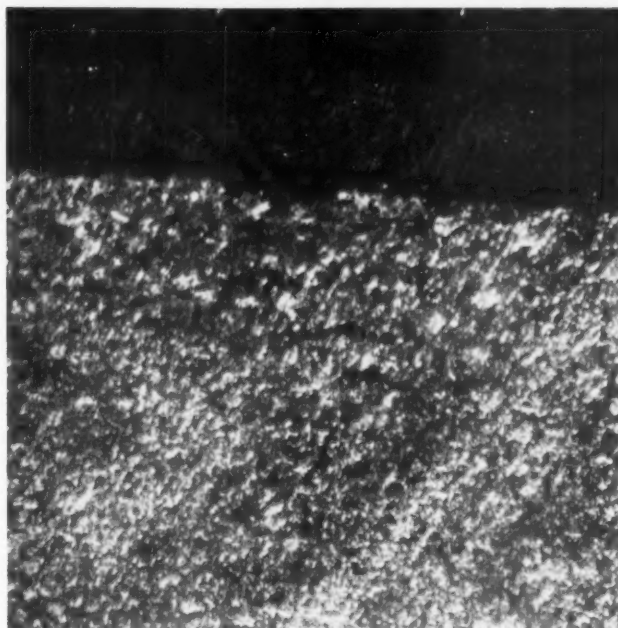


Fig. 4. Another illustration of inside of spoon  
Silver 0.00008" thick

x 500

ould be kept in mind that all the above  
s to peacetime manufacture and not  
ent conditions. It should be stated fur-  
that the author has seen all the above  
stitution, including replacing zinc for  
mium.

the greatest offender to a good name for  
electroplating industry is thickness of the  
posited coating. As has been pointed out,  
natural to produce extremely thin coat-  
in this particular field and the industry  
whole should guard against such short-  
ings.

To illustrate the harm that can arise from  
a situation, the following actually hap-  
ed and can be proven from records. One  
t, as the author was traveling from New  
s to a New England town, he happened  
be listening to a radio program. During  
commercial an offer was made to the  
ie in which a "genuine electroplated  
spoon" would be given provided the  
mer would send a box top and a few  
s to the sponsoring company. As one  
ested in the electroplating industry, the  
se "genuine electroplated spoon" caught  
fancy. It should be pointed out that  
program was over a national hook-up  
had a preferred spot on the air. It

was decided to investigate further the "genu-  
ine electroplate". One of these spoons was  
obtained and photomicrographs have been  
made.

In Figure I the outside of the spoon is  
shown at 500X. Here the thickness is 0.0004  
inch. At this point the greatest amount of  
wear is encountered. A section of the handle  
of the spoon is shown in Figure II. Here  
the silver deposit is 0.00014 inch. The  
photomicrograph is also at 500X. In Figures  
III and IV, also at 500X, are shown two  
sections of the silver deposit inside the bowl  
of the spoon. In both cases the thickness is  
0.00008 inch. This gives an average thickness  
as follows:

$$\begin{array}{r} 0.0004 \\ 0.00014 \\ 0.00008 \end{array}$$

$$0.00062 \div 3 = 0.000207 \text{ inch}$$

The figure 0.000207 inch is approximately  
two ten-thousandths and this is pretty thin.  
Is this "genuine electroplate"? Is the in-  
dustry willing to let such as the above be  
representative of the products turned out by  
the electroplating manufacturers? Perhaps  
we should ask ourselves "what is genuine  
electroplate? Are we ready to define it?"

Genuine is defined in one dictionary as fol-  
lows: Of the original or true stock, or of the  
authorship claimed; not spurious, adulter-  
ated, or counterfeit. Not affected or hypo-  
critical; rank; sincere; true.

Does this fit into the definition of "genuine  
electroplate" used above?

What is to be done about such?

At the present time the Government is  
taking care to see that it gets good plating  
work. This is being accomplished by having  
specifications for all jobs. Should the in-  
dustry recognize certain specifications? Some  
very good work has been done by a number  
of Societies cooperatively with the U. S.  
Bureau of Standards. This work should be  
continued and definite standards established.  
These should be adhered to by the industry  
and the deposits marked so that the general  
public would know just what they are buy-  
ing and what they are getting. In this way  
good deposits could be put on the market  
and "Milady" would then accept plating as  
a method of finishing which would last.  
Until something like this is done, there will  
still be national radio programs advertising  
objects with a "genuine electroplate" finish  
which will last three months, maybe.



# THIS IS WASHINGTON—

By George W. Grupp

METAL FINISHING's Washington Correspondent



## Are Union By-Laws Enforceable On Employers?

The War Labor Board, on July 10, 1945, rendered an unprecedented decision by ordering the International Typographical Union to revoke its policy designed to force recognition of union by-laws on employers. The War Labor Board threatened to refuse to recognize future International Typographical Union wage agreements unless the union reversed its stand to force acceptance of its by-laws upon employers. The Board stated that the union "has challenged the authority of the Government of the United States in time of war to provide for peaceful adjustment of labor disputes. It has placed its laws above the laws of the United States Congress." But in spite of this blast the union refuses to budge because it claims that union by-laws are not subject to arbitration. This is an important labor union dispute and the outcome will have a far-reaching effect.

## New Priorities System Placed in Operation

Since July first the new "Priorities Regulation No. 29" has begun to be instituted gradually. And where any inconsistency exists between PR 29 and any other WPB regulation or order, PR 29 controls "unless the other expressly states the contrary." Under the new priorities rating system the present AA rating method and the Controlled Materials Plan will be discontinued at the end of 1945 and replaced by a system in which the AAA rating will still be assigned in emergencies as under existing procedures but a new MM rating will be assigned by military agencies. The WPB itself will assign the MM rating only in cases where it is clearly necessary for the war effort or for requirements of similar urgency. During the transition period from July 1 to December 31, the MM rating will be equivalent to AA-1. The AA ratings also will be retained for certain materials if it is not practicable to adapt existing controls to the new system. Beginning October 1, 1945, no more AA ratings will be assigned by WPB or other agencies except for deliveries to be made before January 1, 1946. Prior to October 1, 1945, WPB will cancel all outstanding AA ratings calling for delivery after the end of 1945, whenever this can be done without interfering with war production or war-supporting activities. The Controlled Materials Plan and all of its regulations, except those restricting inventories, will automatically expire on December 31, 1945.

## Bureau of Labor Statistics Figures Belittled

Fireworks are expected in the Department of Labor for the new secretary, Lewis B. Schwellenbach expressed the opinion to labor leaders that the Bureau of Labor Statistics figures are "lousy," and that its work is "too academic" and "not realistic enough." Even the American Statistical Association expressed the opinion that the Bureau of Labor Statistics cost of living index failed to make allowances for wartime changes in habits of living, wartime lower qualities of goods, and the scarcity of low-priced goods. All of which reminds the writer of a remark made by one of his college professors who humorously said that there are three kinds of liars, namely: white liars, darn liars, and statisticians. But apart from that, since the Little Steel formula is based on the Bureau of Labor Statistics cost of living index, and since the cost of living is higher than reported by the Bureau of Labor Statistics, it should become

obvious to all members of industry that the Little Steel formula will be revised upward.

## Charles A. Rice, WPB Plating Equipment Chief, Resigns

Charles A. Rice, chairman of the Oxoseal Co. of Vancouver, British Columbia, Can., who came to Washington in the spring of 1943 as assistant to William W. McCord, and who succeeded him when the latter retired from the War Production Board, resigned on July 10, 1945, as Chief of the Electroplating and Anodizing Equipment Section, General Industrial Equipment Division, of the War Production Board. Mr. Rice, who is well known to the metal finishing industry, is considering a number of different propositions in addition to furthering the interests of his company.

## Contractors Guide Issued

During the past month the War and Navy Departments jointly issued a new "Army-Navy Contractors Guide for Prime and Subcontractors." This booklet deals with the nine essential steps in applying for settlement of contracts, with instructions on how to plan now for termination of contracts, and with information on where to consult Army and Navy field officers concerning contracts and contract settlements. The Guide is profusely illustrated with all the forms needed for contract settlement. No contractor doing work for the Army or Navy should be without a copy if he wants to know how to plan for the settlement of terminated fixed-price contracts with the Army and Navy. Copies may be had from the local field officers.

## Billions of Dollars In Contracts Cancelled

Director of Contract Settlement Robert H. Hinckley recently reported that commitments canceled by contract termination during the month of May amounted to a total of \$5,100,000,000. Mr. Hinckley predicted that the rate of settlements in August and September will be about \$2,000,000,000 per month as compared with \$1,700,000,000 in May.

## WPB Restates Policy On War Contract Cancellations

The War Production Board restated its policy on the cancellation of war contract on June 23, 1945, by amending Directive 40. The amended section states that (1) war contracts will be canceled as rapidly as it is possible after the declaration of V-J Day; (2) procedures for clearance and consultation on cutbacks will cease to be effective after V-J Day, and (3) all procurement agencies must report, by program, to the WPB's Production Readjustment Committee all programs which are expected to be continued after V-J Day.

## Critical Materials List Revised

The Joint Committee on Critical Materials and Products submitted a revised list of critical materials and products to the War Production Board on July 10, 1945. The revised list includes such items as antimony, benzene, benzyl benzoate, bismuth, cadmium, cans, capacitors, corundum primary grain, cresols and cresylic acid, drums and pails, hydrogen peroxide, lead, fractional horsepower electric motors, naphthalene and naphthenic acid, platinum, phthalic anhydride, resistors, rosin, sodium bichromate, tin, and microcrystalline and paraffin waxes.



### Extension of Authorization Procedure Revised

The War Production Board announced on June 30, 1945, that extensions of authorizations for use of allocated chemicals under the "one letter" plan which was instituted in February, 1945, by the Chemicals Bureau of the WPB has been discontinued. Hereafter applicants requesting an extension of authorization are required to use separate forms and letters required by the governing M-300 schedule or other order.

### Excess Profit Taxes May Be Eased

Tax revision legislation is underway to improve the cash position of commercial and industrial establishments for the House Ways and Means Committee and the Senate Finance Committee have approved measures which, if passed, will ease the excess profits tax, speed up tax refunds to corporations, and improve the cash position of corporations by \$5,000,000,000 for reconversion. Both committees approved legislation which would increase the excess profits exemption from \$10,000 to \$25,000 beginning with the 1946 tax year. Both approve measures which will allow corporations to take currently the postwar credit of 10 per cent of the excess profits tax. And they approved legislation which will speed up all refunds.

### Enemy Technical Information to Be Made Available

The evaluation and distribution of technical information received from occupied countries will be the work of the Enemy Technical Reports Committee of the War Production Board with Dr. Donald B. Keyes as the chairman. The distribution of this material will be on two bases. 1. Where military security does not permit general publication, information will be distributed on a classified basis to all persons whose possession of the knowledge would advance the war effort and who may under security regulations properly receive such classified material. 2. Where military security is not involved, and where the information is not classified, it will be distributed through publication in appropriate technical journals or through distribution of reports to all interested applicants.

### Hatch-Burton-Ball Labor Relations Bill Should Be Studied

The Hatch-Burton-Ball labor relations bill should be studied by the industry for it classifies the different types of labor disputes; it states the methods of handling each kind of dispute; it deals with fact finding boards; it introduces compulsory arbitration; it rewrites the National Labor Relations Act; it amends the Wagner Act; it changes the legal relationship between employers and employees; and it replaces the National Labor Relations Board with a "Federal Labor Relations Board."

### CIO Asks President To Relax the Little Steel Formula

The CIO has sent a petition to President Truman, because it believes there is a growing uneasiness among wage earners, which states: "We submit that you, by Executive Order, should revise the national wage policy and restore the original authority of the National War Labor Board to approve or direct such wage adjustments as may be necessary and which will not substantially affect the cost of living: (a) To aid in the effective prosecution of the war; (b) To eliminate substandard wages; and (c) To assure a continued high level of purchasing power for the maintenance of full production and full employment."

### New Directory of Labor Market Areas Issued by WMC

The War Manpower Commission recently issued a new Directory of Labor Market Areas which may be bought for 25 cents from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. This Directory lists all communities of 1,000 or more as of June 1, 1945, within WMC's 301 classified labor market areas.

### Metal Finishing Industries Granted Preferential Ratings For Reconversion

The War Production Board announced, on July 12, 1945, that during the period June 30th through July 6th it granted preferential ratings for construction and equipment for reconversion purposes to the amount of \$297,000 to the aluminum products industry, \$280,000 to the silverware and plated ware industry, \$4,114,000 to the electric lighting fixture industry, \$669,000 to the chemical industry, and \$294,000 to the electroplating and polishing industry.

### New Comers in Business Assured Fair Chance

To clarify the policy of the War Production Board with respect to newcomers to business and industry, including war veterans, the Board issued General Program Order 517 on July 1, 1945, which provides for the establishment or increase of exemptions, for new small users, from restrictions of limitation and materials conservation (L and M) orders.

**Reconversion Is Slow** One-half of 1945 has passed into history, Germany has been defeated, and the United States is moving slowly in reconversion for peacetime production, even though most of this progress is still in the paper stage. The real impact of reconversion will come with the defeat of Japan. Of course, many limitations on the production of civilian goods have been relaxed or revoked, but the materials for making them are not available in large quantities for we still have a hard fight on our hands with Japan. Cutbacks should not deceive one, for singly a cutback may seem large, but in the overall picture such cutbacks are unimpressive. And now that veterans are beginning to return to civilian life, communities which made plans for their homecoming to absorb them in industry are getting some practical experience on how to handle the veteran re-employment problem.

### Government Keeps Contract Settlement Records for Five Years After War

The Office of Contract Settlement issued Regulation No. 19 on July 14, 1945, to prescribe what records all contracting agencies of the Government must keep to substantiate termination settlements, to facilitate review, and to prevent and detect fraud. After stating what records must be kept and sent to the General Accounting Office, it states that all records must be kept for at least five years after the termination of hostilities of the present war. Contractors of war work should take the hint from this regulation to keep their records for protection purposes.

### Resellers of Controlled Materials Eliminated From Directive 48 of CMP 1

Direction 48 to Controlled Materials Plan Regulation No. 1 was issued on July 6, 1945, for the purpose of eliminating from the regulation the reseller of controlled materials. The amended direction now refers only to the buyers and sales of controlled materials by intermediaries.

### Renegotiation Law Extended By Congress

A few days before the contract renegotiation and compulsory repricing was to expire, June 30, 1945, Congress extended the life of this act until December 31, 1945.

### Thirty-Day Stockpile Permitted for Civilian Production and Servicing

The War Production Board clarified Priorities Regulation No. 1 on July 12, 1945, by issuing Interpretation 17 which provides that any person may receive, in anticipation of starting or resuming civilian production, the minimum quantity of material he would need during the first 30 days of such production, provided no priorities assistance is used to get such material. In other words the WPB has placed a 30-day advance stockpile ceiling on civilian production.

### Surplus Property of Interest to the Metal Finishing Industry

The Reconstruction Finance Corporation, a disposal agency designed by the Surplus Property Board to sell surplus capital and producers' goods, announced on July 16, 1945, that, as of May 31, 1945, it had sold surplus property valued at \$235,380,000 for \$133,462,000. According to the report issued with this announcement it had on hand on May 31, 1945, electroplating and anodizing equipment which cost \$288,329.39. It also had in surplus inventory \$11,839 worth of mineral waxes, \$240 worth of crude natural abrasives, \$317 worth of vegetable oils, \$2,206 worth of animal and vegetable waxes, \$3,203 worth of miscellaneous oils and waxes, \$305 worth of gasoline and liquid hydrocarbons, \$2,437 worth of naphtha solvents, \$50,476 worth of heavy chemicals, \$2,019,616 worth of industrial fine and related chemicals, \$24,109 worth of gum and wood chemicals, \$141,179 worth of miscellaneous organic chemicals, \$4,550 worth of paints, varnishes and lacquers, \$1,884,351 worth of paints, varnishes, lacquers, Japans, \$4,664 worth of color pigments, \$2,961 worth of paint driers, \$57,419 worth of plastic materials, \$17,863 worth of nickel and base alloy shapes and forms, \$343 worth of tin and base alloy shapes and forms, \$11,414 worth of zinc and base alloy shapes and forms, \$12,984 worth of lead base alloy, \$2,469,807 worth of precious metals and alloys, \$534,156 worth of wheel abrasives, \$5,365 worth of abrasive basic products, \$662,441 worth of graphite and carbon base products, \$12,794 worth of natural graphite, \$189,559 worth of graphite and carbon manufactured, \$2,862 worth of manufactured mica, \$872,747 worth of compressors and dry vacuum pumps, \$261,083 worth of industrial trucks, tractors and trailers, \$88,058 worth of fan and blower equipment, \$254,419 worth of industrial fans and blowers, \$331,126 worth of dust collection equipment, \$97,595 worth of air purification equipment, \$65,147 worth of generators, dynamos, \$3,810,815 worth of generator set units, \$429,922 worth of electric motors, \$26,402 worth of hot cathode rectifiers, \$401,136 worth of thermal driers and dehydrators, \$129,463 worth of heat exchangers, \$21,285 worth of motor starters and controllers, \$8,380,522 worth of heat treating furnaces and devices, \$117,728 worth of metal spraying equipment, \$11,505 worth of laboratory instruments and apparatus, \$148,001 worth of water purification equipment, and millions of dollars worth of other capital goods which might interest members of the metal finishing industry. For details on available capital goods inquiries should be made at the nearest local office of the RFC.

### Aluminum Utensils Industry Busy With War Orders

Members of the Aluminum Utensils Industry Advisory Committee of the WPB at their June meeting expressed the opinion that because facilities and materials for the making of aluminum utensils are still largely needed for the war effort, no appreciable increase in production is expected until the fourth quarter of 1945. At present the industry is still largely engaged in the production of aircraft parts and shell cases.

### Cadmium for Plating Restricted Further

In an effort to assure an adequate supply for essential uses, cadmium was placed under further restrictions by amending Order M-65 on July 10, 1945. Buyers may now order cadmium only when the metal will be used in filling rated orders. It provides that all appeals and other communications in reference to the order must be filed with WPB's Tin-Lead-Zinc Division in Washington instead of with a field office. Part of the amended portion of the order reads: "(g) Restrictions on delivery of cadmium containing items and cadmium plated products. No person may place an order for any cadmium containing item described in paragraph (e), any cadmium plated product described in paragraph (f) or cadmium plating, or accept delivery of any such cadmium containing items or cadmium plated products unless (1) such items or product will be used to fill an order bearing a preference rating or to replace such an item or product withdrawn from

inventory to fill an order bearing a preference rating, and (2) he executes the certification called for. No person may deliver any such cadmium containing item or such cadmium plated product unless he gets directly or through a dealer from the person who will receive delivery thereof a certification."

### Current Chemical Situation

According to official sources the supply of hydrogen peroxide is at present very short; sulphuric acid will soon again be in free supply and the supply of sodium metasilicate is short.

### Effect of Polishing On Plating

There was published in the April issue of the Journal of Research of the National Bureau of Standards an article on "Methods of Polishing Steel and Their Effects Upon the Protective Value of Electroplated Coatings" by Gerald A. Lux and Dr. William Blum. This interesting article has been republished in pamphlet form as Research Paper PR 1645 by the National Bureau of Standards. This paper deals with the methods of defining surface finish; the materials and equipment used in polishing; the preparation of polishing wheels; the polishing procedure; the methods of plating; the atmospheric exposure tests; and the accelerated corrosion and porosity tests of specimens plated with chromium, copper and nickel.

### Hunting License

Limitation Order L-65-a was revoked on July 2, 1945, to permit unrestricted production of electric flatirons whenever materials can be found. Because of the present shortage of some essential materials such as nickel, stainless steel, phenolic plastics and resistance wire, it is unlikely that there will be an immediate increased production of electric irons.

### Electric Motor and Generator Directory Compiled by WPB

As the result of a survey the War Production Board has compiled a directory of the builders of fractional and integral electric motor and generator manufacturers in the United States. The companies are listed in the directory according to the various types of electric motors and generators such as geared and non-geared, d.c. motors and generators, synchronous motors, and a.c. generators. Copies of this directory have been sent to the various manufacturers.

### Hunting License

Through the "open-ending" amendment of Limitation Order L-176 on July 4, 1945, unrestricted production of electric fans is now permitted provided one can get the materials.

### Manpower Reports No Longer Required With Form CMP-4B Allotment Applications

Direction 74 to CMP Regulation No. 1 was issued on July 10, 1945, for the purpose of providing that producers applying for materials are no longer required to file a statement of manpower requirements (Form WPB-3820) if they are in the less critical labor areas, and regardless of the area if the establishment employs less than 100 persons.

### Metals Restrictions For Caskets Removed

Relaxation of restrictions on the use of metals, to permit the resumption of production of all metal caskets was accomplished through amending Limitation Order L-64 on June 29, 1945. The use of tin, antimony, antimonial lead, lead or zinc, however, may be used in the production of burial units only to the extent that such is not restricted in conservation orders M-43, M-112, and M-38 series, and the M-11 series. Amended order L-64 removed metal limitations on the production of casket handle hardware and casket corners.



## Nickel Plating On Hardware May Be Eased

Members of the WPB Hardware Industry Advisory Committee were recently told that hardware valued at about \$60,000,000 will be needed to meet the 1945 demands for construction activities. WPB representatives reported that nickel is in a better supply condition than formerly, but present stocks are not fully adequate for military needs. But in spite of this nickel scarcity the WPB officials said that it may be possible to obtain nickel for necessary civilian plating of operating parts of hardware, but not for decorative purposes.

**Nickel Situation Easing** The supply of critical alloying materials has improved and the military demand for stainless steel products has decreased, members of the Stainless Steel Industry Advisory Committee were told by WPB officials at their July meeting. This is due to the reduced requirements of other countries for essential nickel.

## Plating Anodes and Salts Tight

At the June meeting of the Flatware Manufacturers Industry Advisory Committee of the WPB, the members of the committee expressed the opinion that the production of table knives, forks and spoons for civilian use, in amounts in excess for which priorities are given, will depend upon the availability of manpower and certain basic materials. WPB officials told members of the committee that nickel plating of civilian flatware manufactured in addition to the amount produced with priority assistance will have to be restricted for

some time. Anodes and salts in the forms used for plating are not expected to be available at any time in the near future for civilian purposes.

## Porcelain Enameled Ware Shipments Increasing

The Census Bureau reports that the May, 1945, value of shipments of porcelain enameled products such as signs, drainboards and tub covers, table tops, stove parts, refrigerator parts, reflectors, cooking and hospital utensils, and washing machine parts, amounted to \$3,178,104 as compared with \$2,664,326 for May, 1944. The value of the shipments of these products for the first five months of 1945 amounted to \$15,303,513 as compared with \$13,774,403 for the same period in 1944.

## The Status of 160 Orders Changed In May

During the month of May, 1945, the WPB revoked 70 orders ranging from aluminum ware to vending machines, from alarm clocks to typewriters, from bicycles to toys and games, from enameled and galvanized ware to musical instruments. During the same month the restrictions on 45 WPB orders were relaxed. These orders dealt with commodities ranging from acrylic resin to zinc, from dishwashers to motorcycles, from ethyl alcohol to osmium metal. And 45 other orders were tightened to further control commodities, which ranged from antimony metal and oxide to rosin, from benzyl benzoate and chlorate to primary chromium chemicals, from molybdenum to perchlorethylene.

# ANALYSIS OF HYDROFLUORIC-NITRIC ACID STAINLESS STEEL PICKLING BATH

(Concluded from page 333)

## Remarks

Analyses of a large number of pickling solutions has shown that for room-temperature operation of the bath the total acid and nitrate-ion concentrations are not critical if kept within the following approximate limits: total acid 0.15 to 0.35 equivalent, nitrate ion 7.5 to 20.0 grams per 100 ml. of sample (4). The absolute amounts of iron and fluoride present are not critical up to at least 3 grams of iron and 6 grams of fluoride per 100 ml. of sample, even though the ratio of their concentrations has an effect on the pickling rate. For the most rapid pickling action, the molar ratio of fluoride to iron should be kept about 6 to 1. If it falls below 3 to 1, pickling is generally very slow. The minimum ratio depends on the annealing conditions and the resulting oxide scale. The chromium and nickel content of the bath does not appreciably affect the pickling efficiency.

In some cases, the determination of sulfates may be desirable. Standard gravimetric methods such as those outlined by Treadwell and Hall (9) have been found satisfactory.

The accuracy obtained from the above outlined methods is more than sufficient in view of the wide ranges of concentrations which are allowable. The procedures were designed for speed and practical convenience rather than for extreme accuracy.

Synthetic pickle solutions of known composition were analyzed by the outlined procedure. In each case the concentrations of

iron, chromium, and nickel were varied. The data are shown in Tables I to IV. The results of each experiment represent an average of at least three determinations. Iron contents were determined by a gravimetric procedure in which the iron was separated from the other metallic ions, and finally weighed as ferric oxide. These gravimetric values compared favorably with those obtained by the present rapid method.

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- (8) Stark, G., *Z. anorg. allgem. Chem.*, **70**, 173 (1911).
- (9) Treadwell, F. P., and Hall, W. T., "Analytical Chemistry," 9th English ed., Vol II, New York, John Wiley & Sons, 1942.

drops of Alizarine Red S indicator are added. Sodium hydroxide, 0.5 N, is added until the solution is permanently pink. The color is discharged by adding diluted hydrochloric acid (1 to 200) until the solution is just light yellow, then 2 ml. of the buffer solution are added. The solution is titrated over a white background with thorium nitrate until the appearance of a light pink color, which lasts for 3 to 4 minutes. The thorium nitrate is added slowly while the solution is stirred continuously. There is some pink color formed during the titration because of the absorption of the dye on the thorium fluoride precipitate. However, the sudden increase in pink color at the end point is easily discernible.

The normality of the thorium nitrate is determined in exactly the same manner by titrating against sodium fluoride, except that the distillation is omitted. Ten milliliters of the standard sodium fluoride solution are pipetted into a 100-ml. volumetric flask and diluted to the mark, and 10 ml. of this diluted solution are titrated as above. The weight of fluoride ion per 100 ml. of pickle solution is calculated as follows:

$$M = \text{ml. of thorium nitrate required to titrate a 25-ml. aliquot of the distillate}$$

$$N = \text{normality of thorium nitrate solution}$$

$$R = \text{atomic weight of fluorine}$$

$$Z = \text{grams of fluoride ion per 100 ml. of pickle solution}$$

$$MPR = \frac{M \times N \times R}{Z}$$

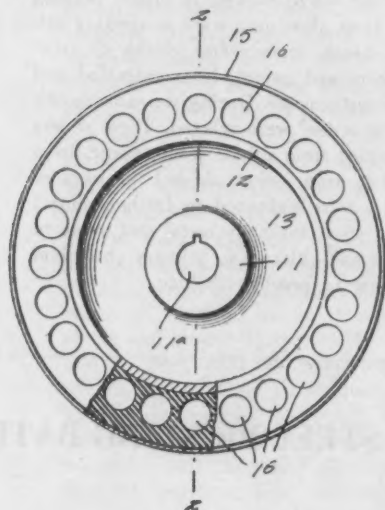
$$Z = \frac{MPR}{5}$$



## Patents

### Polishing Drum

*U. S. Pat. 2,377,880. R. S. Gutsell, June 12, 1945.* In abrading tools for abrading or polishing service, wherein the tool includes a service band or sleeve carried by a rotatable drum and held to position on the drum by centrifugal force action effective on the drum during service, the drum of said tool including an annular rim zone formed of rubber or rubber-like substance, said rim



zone being carried by and secured to a hub or body zone and containing at least one series of spaced-apart openings each of which extends from side to side of the rim and with the openings spaced from the inner and outer peripheries of the rim zone, each opening being of generally-similar cross-sectional dimensions from end to end of the opening, the openings of a series having generally similar distance relation to the drum axis to thereby secure band-securing expansion of the rim zone and compressibility of the tool during service.

### Pickling

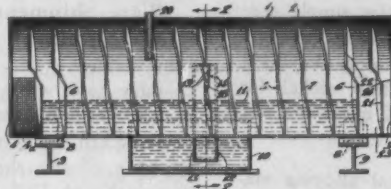
*U. S. Pat. 2,377,876. H. N. Gilbert, assignor to E. I. duPont de Nemours & Co., June 12, 1945.* The process for removing metal oxide from the surface of a metal article composed of metal substantially non-reactive with alkali metal hydroxides which comprises immersing said article in a molten composition comprising at least one alkali metal hydroxide having about 1 to 20% by weight of alkali metal hydride dissolved therein, at a temperature below the melting point of said article.

### Grinding Wheel

*U. S. Pat. 2,377,995. L. Coes, Jr., assignor to Norton Co., June 12, 1945.* An abrasive article comprising abrasive grains bonded as a porous body by means of vitrified ceramic material and a filler incorporated in the pores comprising furfuryl alcohol polymerized with lignin.

### Cleaning and Pickling Machine

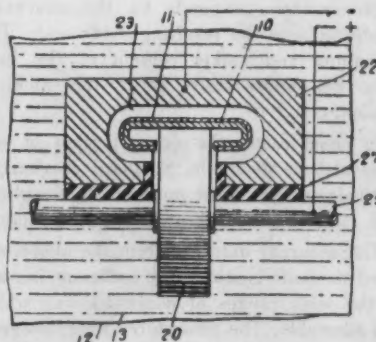
*U. S. Pat. 2,377,964. N. Ransohoff, June 12, 1945.* An apparatus of the class described



comprising a drum rotatable about a horizontal axis, a tank arranged beneath the drum and adapted to contain a supply of liquid, a scoop located at the periphery of the drum and having a leading edge adapted to scoop up liquid contained within the tank as the drum is rotated, a tube having its one end communicating with the trailing portion of said scoop and having its other end projecting substantially into the drum, an outlet tube having its one end communicating with the outside of the drum and having its other end projecting substantially into the drum such that liquid below a predetermined level in said drum may not flow through said outlet tube, the said drum having a spiral vane extending longitudinally through it and the said inlet and outlet tubes being located in the plane of configuration of said vane, the said tubes being of triangular configuration in cross section with the apexes of the triangles constituting the leading edges of the tubes with respect to the direction of rotation of the drum, whereby the projection of the tubes into the drum does not obstruct the passageway for the parts delineated by the vane.

### Electrolytic Apparatus

*U. S. Pat. 2,378,002. F. E. Drummond and D. E. Bench, assignors to The Himmel Bros. Co., June 12, 1945.* An apparatus of the class described having a compartment containing an electrolyte, means for conducting and guiding a preformed structural member through said electrolyte and for making anodic contact, said guiding and contacting means comprising a plurality of rolls having



axle shafts in said compartment arranged to support the preformed structural member as it passes through said compartment, a cathode member of elongated form having an

inner surface shaped to correspond to the contour of the surface of said structural member, said cathode member supported upon said axle shafts and formed to partially surround said structural member and the upper portions of said anode rolls, and insulating material between the cathode member and said axle shafts.

### Hot Galvanizing

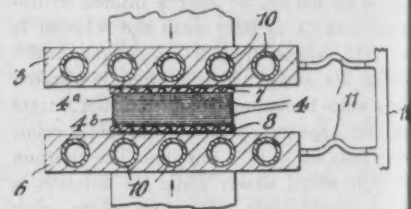
*U. S. Pat. 2,378,458. S. C. Avallone, assignor to The American Steel & Wire Co., June 19, 1945.* The method which comprises coating ferrous metal stock with a layer of copper, passing such copper-coated stock through a molten zinc galvanizing bath, said copper coating being effective to minimize the diffusion between the zinc and the ferrous metal stock at the normal temperature of said molten zinc galvanizing bath, and subjecting said stock to a mechanical cold working operation, effective to elongate it and alter its cross sectional area.

### Abrasive Material

*U. S. Pat. 2,378,399. H. F. Fruth, assignor to Galvin Mfg. Corp., June 19, 1945.* A preformed abrasive material comprising relatively large pieces of body material each provided with a substantially uninterrupted surface coating which includes a mixture of relatively fine abrasive powder and a bonding agent rigidly securing the powder particles to the surfaces of the pieces of body material.

### Felted Abrasive

*U. S. Pat. 2,378,386. R. A. Baumgartner*



assignor to The Carborundum Co., June 19, 1945. In the method of making abrasive articles from a plurality of superimposed layers of abrasive-included, felted fibrous sheet material, the step which comprises selectivity maintaining the outer layers of the superimposed sheet material being compressed in a humidified condition while subjecting the assembly of said superimposed sheet material to heat and pressure to form the desired shape.

### Metal Evaporation

*U. S. Pat. 2,378,476. G. E. Guellich, assignor, by mesne assignments, to American Optical Co., June 19, 1945.* In a device of the character described, a vacuum chamber means for supporting an article in said vacuum chamber, means for supporting a source of coating material in said vacuum chamber and high frequency induction heating means surrounding said means for supporting said supply of coating material for

*Cowles*

**KW**

**CLEAN BRIGHT  
BRASS CLEANER**

● A new outstanding COWLES CLEANER for non-tarnishing cleaning of polished and unpolished brass, copper and bronze in still tanks with or without electric current—also in all types of washing machine equipment. Cowles K W does not attack the metal. It is fast, efficient and economical. Immediate shipment from warehouse stocks.

*Cowles*

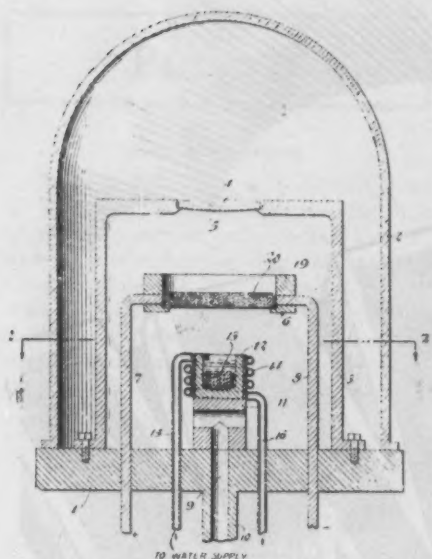
**TECHNICAL  
SERVICE  
on request**

**THE COWLES DETERGENT CO.**

**METAL CLEANER DEPT.**

**7016 EUCLID AVENUE • CLEVELAND 3, OHIO**





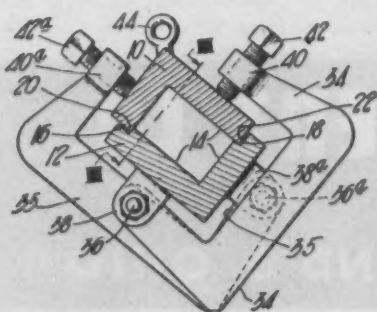
heating the same to vaporize the coating material, and a substantially flat member of porous heat conducting material for filtering and accelerating the vaporized particles passing therethrough, means for heating said member, said member being positioned between said article and said means for supporting a supply of coating material, whereby the vaporized particles will pass through the pores of said heat conducting member.

#### Electrolytic Polishing

U. S. Pat. 2,379,066. I. C. Clingan, assignor to Rustless Iron and Steel Corp., June 26, 1945. The method of polishing chrome-nickel, stainless iron and steel by anodic treatment comprising immersing the metal to be treated in a bath containing 60% to 90% by weight of concentrated sulphuric acid and the remainder water, and passing direct current through the bath of a density of 6 to 12 amperes per square inch of the treated metal surface for such period of time as to prevent gray etching of the treated metal and to polish it while using the metal as the anode and while maintaining the bath at a temperature of approximately 30° C. to 50° C.

#### Anode Mold

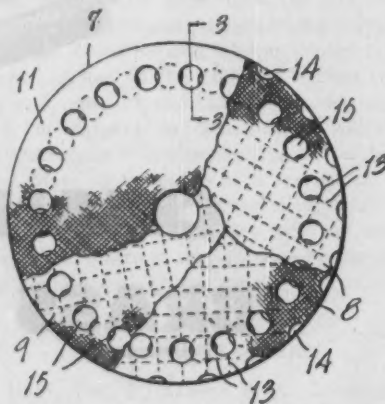
U. S. Pat. 2,378,480. J. G. Huey, assignor to Tennessee Coal, Iron and Railroad Co., June 19, 1945. A mold of the character herein shown and described, consisting of a



pair of complementary coating sections of substantially right-angular cross-sectional contour, one of said sections having machined grooves extending longitudinally thereof along its inner edges and the other of said sections having mating edge portions machined to neatly fit said grooves, and a plurality of clamp members pivotally mounted to one of said sections adjacent outer faces thereof disposed at right angles to one another, said clamp members having elements engaging faces of the other section disposed at right angles to one another whereby the components of the forces jointly exerted by said clamp members firmly press the mating edge portions of one section cornerwise into the grooves of the other section.

#### Polishing Machine Roll

U. S. Pat. 2,378,643. A. H. Losey, assignor to Hammond Machinery Builders, Inc., June 19, 1945. A contact roll for abrading or polishing belts comprising a plurality of plies of fibrous material bound together, the periphery of the roll having a plurality of non-communicating recesses therein, there being



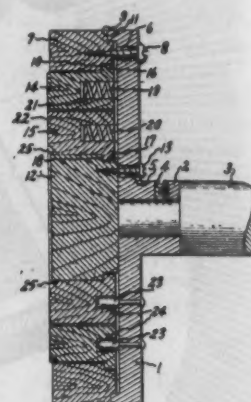
substantial peripheral land portions between the recesses, and transverse holes adjacent the periphery of the roll providing an annular outer rim-like portion at the outer side of the holes which are relatively yielding as compared to the portion at the inner side of the holes.

#### Cleaning and Drying Machine

U. S. Pat. 2,378,758. R. A. Ekstrom, Jr., assignor to Elematic Corp., June 19, 1945. In an apparatus for cleaning and coating articles, the combination of a plurality of tanks for holding different liquids, a burner for each tank, means for supplying air and gas to each burner, a conduit leading from each burner along the bottoms of the respective tanks, a common exhaust pipe, means connecting the several conduits with the exhaust pipe, means for directing some of the gases of combustion into the liquid in the respective tanks to heat and agitate the same, drying means for drying the articles to be treated, and means for supplying heat from the exhaust pipe to said drying means.

#### Polishing Wheel

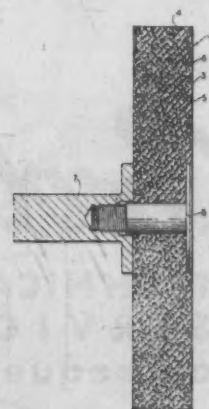
U. S. Pat. 2,379,141. G. S. Fuller, June 26, 1945. A polishing wheel construction including a mounting plate member adapted to be supported on a drive shaft, four concentric circular polishing members of fibrous material, means for securing the inner and outer of said circular members to said mounting plate for providing relatively fixed



circular members on said mounting plate means for loosely retaining the other of said circular members as floating circular members in position between said fixed circular members, resilient means for biasing said floating circular members in a direction away from said mounting plate member, and means for providing a driving connection between said floating circular members and said mounting plate.

#### Polishing Element

U. S. Pat. 2,378,630. R. M. Hill, assignor to Armstrong Cork Co., June 19, 1945. An element for polishing silver and the like with a mixture of abrasive particles and oil comprising a compressible cellular matrix of an oil-resistant vulcanized synthetic poly-



merization product of an open chain aliphatic conjugated diene and cork granules distributed throughout said matrix in spaced relationship, the working surface of said element being constituted of exposed cork granules, separated by the cellular matrix, the cells of which are small and closely spaced to receive and hold the abrasive and oil during polishing.



**FOR HIGH ALKALINITY pH MEASUREMENT...**  
**FOR HIGH TEMPERATURE pH MEASUREMENT...**  
**FOR YOUR PARTICULAR pH MEASUREMENT...**

**Get the instrument  
 Beckman engineers  
 have perfected for the job!**

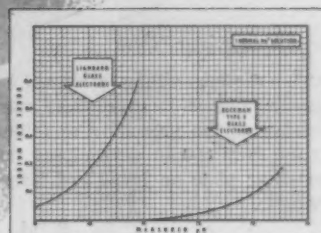
**P**ROPER pH control of processing operations is one of the most important industrial developments in recent years. Step after step in the development of this modern tool has been pioneered by the Beckman research staff—bringing reduced spoilage, improved product quality and lower production costs to thousands of different plants in a wide variety of industries.

Through these years of pioneering, the Beckman organization—world's largest manufacturer of glass electrode pH equipment—has developed advanced types of pH electrodes found nowhere else in the industry... unique electrode assemblies that open up entirely new fields to the greater profits and higher production efficiencies obtainable through accurate pH control.

Among the many pH problems solved by Beckman engineers, the following are typical...

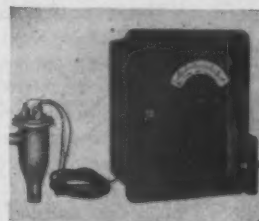
**HIGH ALKALINITY** Even in highly alkaline sodium solutions—a difficult or impossible application with other glass electrode pH equipment—you can obtain uniform accuracy with Beckman equipment. The Type E Glass Electrode—an exclusive Beckman development—makes measurements up to pH 13.5 with a sodium error of only 0.2 in 1 Normal Sodium solutions. In chart at right, above, compare this accuracy with that of standard glass electrodes. This advanced development is of tremendous value in highly alkaline

plating processes... in soap solutions... in processing detergents, cleaners and many other applications. Investigate what this exclusive Beckman development can mean to your present or future plant processing operations!



**HIGH TEMPERATURES** If yours is a process involving high temperatures, remember that Beckman—and only Beckman—has perfected a High Temperature Glass Electrode that can be used continuously in boiling hot solutions. This advancement is particularly useful in many food processes... in boiler feed water conditioning... and in a wide range of chemical processing operations.

**HARD SERVICE** Still another typical Beckman development is the "X9" Electrode—a glass electrode particularly designed for unusually severe operating conditions such as continuous immersion in paper pulps, in ore slurries and other abrasive materials. So sturdy is this electrode that it withstands more than 100 pounds direct force on the immersion end without breaking, and its thick walls withstand an unusual amount of abrasion.



The Beckman Automatic pH Indicator—the most advanced pH instrument available today.



The Beckman Industrial pH Meter—ideal for portable plant and field use.

**WHATEVER** your pH measurement or control problem, let the Beckman research staff study your particular requirements and recommend the type of pH installation you should have. You will get the most advanced pH equipment available—equipment that will still be modern years from now.

**FREE!** "What Every Executive Should Know About pH"—a simple non-technical explanation of pH control, what it is, how it's used. Send for your copy today!



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**BECKMAN INSTRUMENTS**  
 NATIONAL TECHNICAL LABORATORIES • SOUTH PASADENA 9, CALIF.

**INSTRUMENTS CONTROL MODERN INDUSTRIES**

# SHOP PROBLEMS

PLATING AND FINISHING  
POLISHING — BUFFING  
CLEANING — PICKLING  
HOT DIP FINISHES

METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

## Dropping Test

**Question:** We are subscribing to *Metal Finishing* magazine and wish to request your help in advising us the procedure to follow in applying the drop test in determining the thickness of silver plate on brass and beryllium copper parts.

B. M.

**Answer:** A section on the jet test, which is a modification of the dropping test, as applied to silver deposits, will be found on pages 153-4 of the 1944 edition of the *Plating and Finishing Guidebook*.

## Gold Plating

**Question:** We have an application in our plant where we wish to gold plate small stampings made from 18-8 stainless steel and would like to know if this is possible or practical. We know that gold can be plated over various other materials but have not been able to find in the *Plating & Finishing Guidebook*, or any other publication any mention of plating of any kind on stainless steel.

D. V. L.

**Answer:** Although processes have been patented for gold plating direct on stainless steel, especially pen nibs, very satisfactory results should be obtained by using a nickel chloride strike before gold plating. The solution contains the following:

Nickel chloride ..... 2 lbs./gal.

Hydrochloric acid ..... 1 pt./gal.

The stainless steel articles are given a 30 second strike in this solution with direct current at 6 volts, following which, they are rinsed and gold plated as usual.

## Depositing Aluminum

**Question:** A—Has any process been developed commercially or experimentally in which metallic aluminum is obtained electrolytically through an aqueous solution, or an organic solution?

B—Is the attached electrical circuit (not solution) patented? The solution consists of silver and cadmium cyanide. I wish to use this circuit in certain alloy-plating processes.

If the above questions would cause you detailed research, any advice, reference, or suggestion would be sincerely appreciated.

H. J. P.

**Answer:** A—No process has been developed commercially or experimentally for de-

positing aluminum from an aqueous solution.

Experimental solutions have been developed using organic solvents for the aluminum salt. For further information you may refer to:

1. Blue & Mathers, *Trans. Electrochemical Soc.* 65 (1934), and 69 (1936).

2. U. S. Pat. 2,170,375 (1939).

B—The electrical circuit sketched in your letter for applying controllable currents to dissimilar anodes in the same solution has been described in the literature at various times. We do not believe that this is patentable.

## Safety Rules

**Question:** I am interested in obtaining information as to safety rules in electroplating department.

H. S.

**Answer:** We would suggest that you communicate with the National Safety Council, 405 Lexington Avenue, New York, N. Y.

## Bright Nickel Plating

**Question:** We are very desirous of obtaining information on bright nickel plate, and will deeply appreciate any information you may give us relative to the following:

1. Is bright nickel plate universally (including Government) accepted as a satisfactory intermediate coating when the plating system involved is: chrome plate over nickel plate over polished brass castings?

2. Is bright nickel plate superior from the economic standpoint to other methods of nickel plating?

3. What are the problems peculiar to the bright nickel process?

4. How involved is the control of bright nickel solutions?

J. L. W.

**Answer:** Bright nickel is universally acceptable as an underplate for chromium on polished brass. Whether or not bright nickel plate is superior to dull nickel plate will depend on the application.

The problems peculiar to the bright nickel process will vary with type of work being processed, but, in general, solution contamination is much more serious than in the case of dull nickel, and preparation for nickel plating must be more thorough.

Bright nickel solutions can be maintained by chemical analysis and small scale plating tests such as in the Hull cell.

## Bright Dip for Copper and Brass

**Question:** I would like some information on a bright dip solution for custom jewelry work. My problem is to bright dip a copper brass alloy pin with lead solder. I would like to know what mixture to use for a bright dip to attack the lead solder and give it a bright appearance.

H. P.

**Answer:** We do not know of any bright dip which would produce a bright surface on the lead solder, but would suggest that you give the work a strong hydrochloric acid dip after bright dipping, in order to clean up the solder.

## Hard Chromium Plating

**Question:** Being interested in Industrial (Hard) Chromium plating, I have received much help from the article in your eleventh edition, 1942, on Hard Chromium Plating by A. Mankowich.

Could you suggest any written work that would cover this subject in a broader way?

Will you let me know what a year's subscription to your magazine costs, including a copy of the *Plating & Finishing Guidebook*?

P. V. T.

**Answer:** The book, *Modern Electroplating*, has an excellent chapter on this subject, and a section will also be found in the 1944 *Plating and Finishing Guidebook*. The yearly subscription rate to *Metal Finishing* is \$2.00 which includes a copy of the current issue of the *Guidebook*.

Unfortunately, the 1944 edition of *Plating and Finishing Guidebook* is out of print at this time; you may, however, be able to procure a copy at your local library. Copies of *Modern Electroplating* may be ordered from this office at \$6.00 each, payable in advance.

## Electroplating on Graphite or Carbon

**Question:** We are urgently in need of information regarding electroplating of metal on a graphite or carbon base. We have made a literature search and find practically nothing relating specifically to graphite or carbon. If you could give us any information on this subject we would be very grateful.

V. P.

**Answer:** Electrotypers commonly plate on graphited wax, using both nickel and copper electrotyping solutions. Silver can also be deposited on this material. We would suggest that you communicate with the National Bureau of Standards which has prepared bulletins on both copper and nickel electrotyping.

# An example of extra features...



FABRICATED FROM STANDARD MILL FORMS, this Monel crate has a capacity of 4 tons, yet weighs only 1100 pounds. It is used for handling munition parts in hot sulfuric acid.



PICKLING MACHINE BASKET designed to carry cylindrical shells which stand on bottom grill and are supported by the top ring. Basket weighs 90 pounds, handles a 425-pound load. Photos on this page courtesy of Rolock, Inc.

## get them in YOUR pickling equipment, too!

Your new equipment can be lighter . . . more corrosion-resistant and it will last longer.

You'll handle increased payloads . . . and save time and labor.

Take the crate pictured above, for instance. Rolock, Inc., pickling equipment manufacturers of Fairfield, Conn., fabricated it for a customer who had to replace a cast crate used for dipping munition parts in a 6% sulfuric acid solution at 180° F.

The original cast crate weighed 30% more. Rolock's improved design in wrought Monel mill forms maintains essential dimensions and style, yet provides the customer with a lighter, more economical, increased-capacity unit.

Monel's high tensile strength (80-95,000 psi for hot rolled bar) and its inherent toughness enable it to withstand heavy strains imposed by load and impact.

The use of mill forms is of considerable value in plants where changes and improvements in equipment are often necessary, or where it is desired to try out experimental designs without going overboard on costs. And another point . . . it's possible to *modify* Monel equipment, a feat that can't always be performed with other types of equipment.

These features . . . strength, toughness, corrosion resistance, availability of forms, ease of fabrication, economy in operation . . . all contribute to pickling room efficiency. *And in Monel equipment, you get them all.*

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, N. Y.

# MONEL

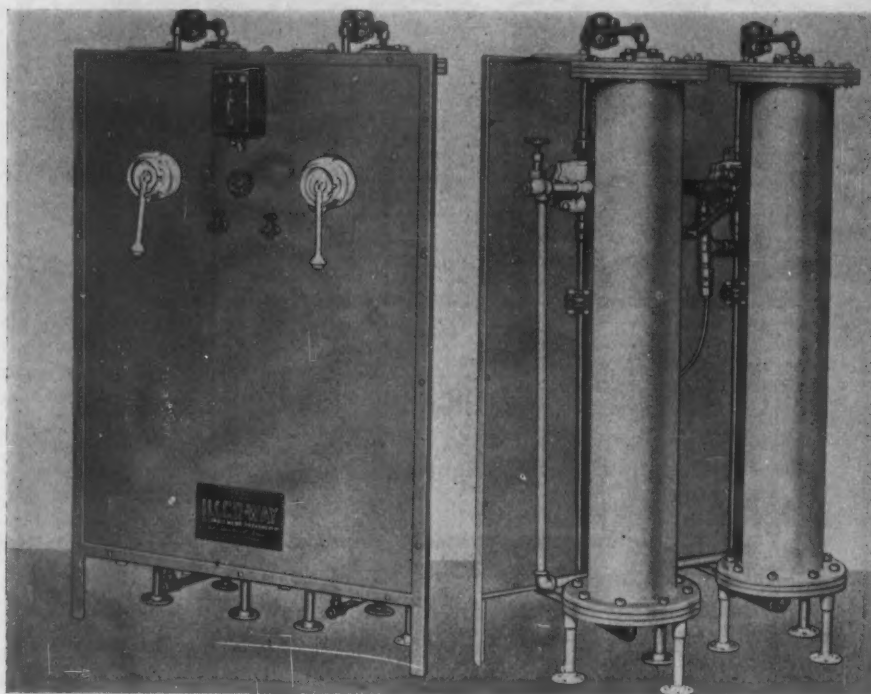
## NICKEL ALLOYS

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "RR" MONEL • INCONEL • "2" NICKEL • NICKEL  
Sheet . . . Strip . . . Rod . . . Tubing . . . Wire . . . Castings . . . Welding Rods (Gas & Electric)



# NEW EQUIPMENT AND SUPPLIES

NEW PROCESSES, MATERIALS AND EQUIPMENT FOR THE METAL INDUSTRY



**De-ionized Water Lab Unit**

Development of compact laboratory units for producing purified water comparable to distilled water has been announced by the Illinois Water Treatment Co., Rockford, Illinois, makers of "Illco-Way" De-ionizing Units and other water treatment equipment.

Large-size "Illco-Way" units, embodying the De-ionizing principle, have been in operation in nationally known plants for over five years. The laboratory units broaden the field of application, however, and provide laboratories and technicians with high flow rates from relatively small-size equipment.

Cost of pure water produced by this equipment is 1% to 10% of the cost of distilled water, according to Illco officials.

The unit illustrated produces 100 gallons

per hour, is 60 inches high, 30 inches wide, 20 inches deep. A larger "Illco-Way" laboratory unit produces 100 gph, and a smaller one (portable), 12 gph. Large-size "Illco-Way" units, embodying the same De-ionizing principle, and with flow rates ranging up to 500,000 gph, have been in operation in nationally known plants for over five years.

Economy of operation is a dominant factor. Periodic dismantling for cleaning is not required, and the quality of the water is protected throughout the equipment by Saran plastic and hard rubber. Water remains under pressure to the point of use. No cooling water is required, no heat or fuel.

Further information may be obtained by writing to the Illinois Water Treatment Co., Dept. MF, 856-5 Cedar St., Rockford, Ill.

## Carbon Remover

Phillips Chemical Company, makers of industrial and maintenance chemicals, presents Carbo-Blitz, a new high efficiency, super-speed carbon remover.

Barbo-Blitz is claimed to be non-flammable, non-toxic and non-injurious to the worker or the work. It is used cold, in any container and is entirely safe for all types of metals and alloys.

It is stated by the company that actual comparative tests on identical carbonized pistons, both ferrous and non-ferrous, Diesel engine valves and other badly carbonized

test pieces show that Carbo-Blitz operates safely and efficiently at from 5 to 10 times the speed of ordinary carbon removers, with no need for scraping or wire brushing and consequent danger of injury to surfaces. In other actual shop tests, deposits that still resisted removal after 12 hour soak in other carbon removers were completely cleaned in from one to two hours. Carbo-Blitz compares favorably in price with ordinary carbon removers and is sold in 5, 15 and 55 gallon containers.

Further information may be obtained by writing to Phillips Chemical Co., Dept. MF, Touhy Ave., Chicago 45, Ill.

## Brass Cleaner

Cowles Detergent Co., Dept. MF, 7016 Euclid Ave., Cleveland 3, Ohio, announces the latest development of their Research Department—Cowles KW—Clean Bright Brass Cleaner. It can be used in still tank (with or without electric current) and in washing machine equipment. KW cleans bright and does not attack or tarnish the metal, also adaptable to cleaning die castings. Full information on request to the company at the above address.

## PROFESSIONAL DIRECTORY

### JOSEPH B. KUSHNER, Ch.E.

#### Metal Finishing Consultant

War plating plants designed and streamlined for increased production.

LA 4-9794 233 W. 26th St.

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### G. B. HOGABOOM JR. & CO.

#### Consulting Chemical Engineers

SALT SPRAY TESTING — CERTIFIED TO MEET ARMY AND NAVY SPECIFICATIONS. Testing of deposits—thickness, composition, porosity. Solution analyses, plant design, process development.

44 East Kinney St. Newark 2, N. J.

### Platers Technical Service Co.

#### Electroplating and Chemical Engineers

Complete services, including solution analyses, process development and deposit tests.

S. C. Taormina ..... Tech. Director

Dr. C. B. F. Young ..... Tech. Advisor

59 E. 4th St., N. Y. C. ORchard 4-1778

### "Electro Chemical Technology"

E. J. HINTERLEITNER AND ASSOCIATES

821 NORTH AVENUE W.

WESTFIELD, NEW JERSEY

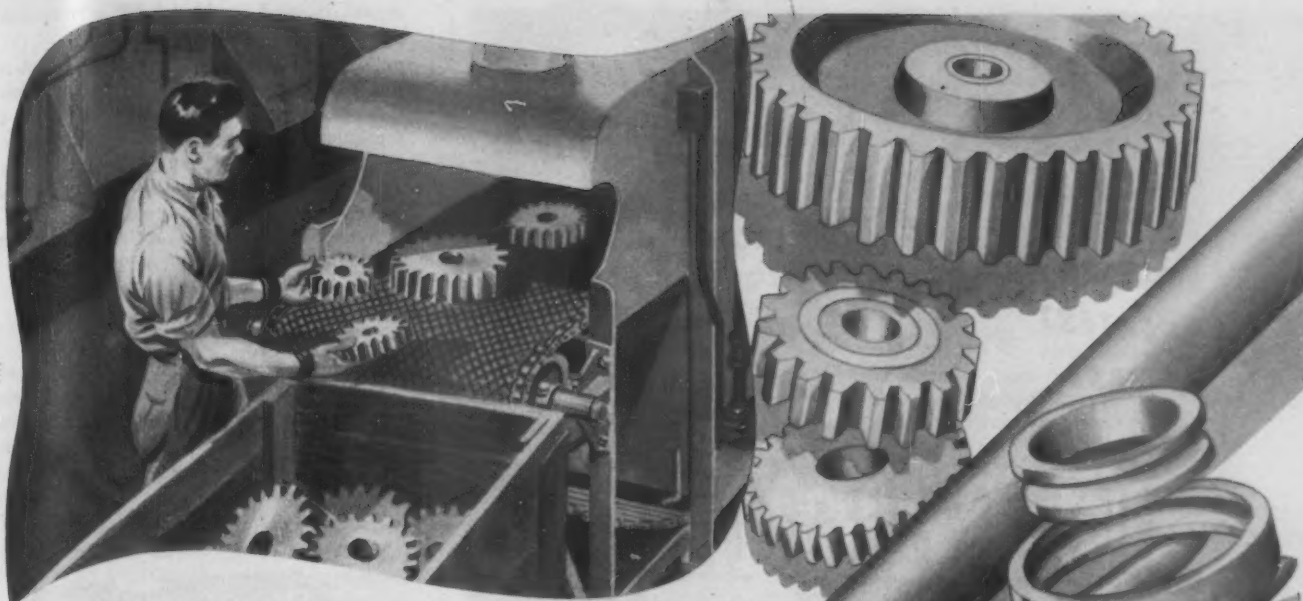
PHONE: WESTFIELD 2-6706

NATIONWIDE, COMPLETE CONSULTING SERVICE FOR THE METAL FINISHING INDUSTRY.

Plant Design and Layout, Production Set-Up, Control and Product Testing, Cost Estimates, Etc.

20 YEARS IN FIELD  
MEMBER A.E.S.

RE-CONVERSION AND PREPARATION FOR  
PEACE-TIME PRODUCTION: — SPECIALIZATION



## DIVERSEY D-C No. 16 *cleans* METAL *FASTER*

Speeds production . . . slashes costs!

Plant reports \$10,000 yearly saving with new  
type emulsion cleaner, 300% faster cleaning.

### EXPERT HELP ON METAL CLEANING

If you need help on any metal cleaning . . . or working . . . problem, just call for the DIVERSEY D-Man. Backed by a Research Laboratory that has spent 18 years developing special purpose products, he is always on deck to lend a helping hand . . . often finds ways to step up production with less manpower.



A war plant searching for a better, faster way to clean metal gears called in a DIVERSEY D-Man. The soap base cleaner used was replaced with DIVERSEY D-C No. 16. After switching, the company reported gears clean and free of all polishing compound with a single run through the automatic washing machine . . . a 300% increase over former production, when three or four washings were necessary. Cleaning costs were cut in half, a net yearly saving of \$10,000.

DIVERSEY D-C No. 16 may be used . . .

1. As a water emulsion cleaner for use in automatic washers handling iron and steel parts where rust inhibition is necessary.
2. As a solvent for removing oily and greasy contaminations such

DIVERSEY D-C No. 16 may be used on all metals for a wide variety of purposes.

as buffing and polishing compounds, smut and dirt.

As a cleaner, D-C No. 16 combines effective solvent action with wetting and emulsifying power. The emulsion is stable, creamy-white and non-foaming . . . excellent for use in spray type washers. Leaves a light, clean, rust-resisting film that won't dirty or gum inspection gauges.

DIVERSEY D-C No. 16 is practically odorless, safe, non-toxic, non-corrosive, and easy to remove. It may be used on all metals for a wide variety of purposes. Make a test of this remarkable cleaner on any of your cleaning operations. For a liberal experimental sample, write to: Metal Industries Department.

**THE DIVERSEY CORPORATION**  
53 W. Jackson Blvd., Chicago 4, Illinois



**DRIES BY  
AIR—  
WITH THE  
GREATEST  
OF EASE**



# UNICHROME\*

## AIR-DRY RACK COATING 203

### "Swings" Your Toughest Plating Cycle

All you do is dip your racks in the handy open-end drum; hang 'em up to dry at room temperatures and there you are! All set with a tough, resistant insulation that will stand up to your *severest* solutions. Many shops are getting 500, and even 1000 cycles before recoating.

You see, new and improved synthetic resins are responsible for these outstanding properties of Unichrome Air-Dry Rack Coating 203. Constant research in selecting and formulating these resins makes sure that you get maximum rack protection and minimum recoating cost. Why not decide to see for yourself—with a trial order today? Write now to our nearest office for data and prices.

\*Reg. U.S. Pat. Off.

### UNITED CHROMIUM, INCORPORATED

51 East 42nd Street, New York 17, N. Y. • 2751 E. Jefferson Ave., Detroit 7, Mich. • Waterbury 90, Conn.

#### PROPERTIES

**Chemical Resistance**—Excellent for all plating cycles.

**Toughness**—Withstands repeated flexing and shop handling—cuts cleanly and easily at contacts.

**Drying**—Dipped in container in which it is shipped and dried at room temperature.

**Adherence**—Excellent.

#### TRY THESE OTHER UNICHROME MATERIALS

**Unichrome Coating 203**—a new rack insulation, similar to Air Dry 203 but which is force dried to obtain the extra adherence required in anodizing and hot, strongly alkaline solution.

**Unichrome Quick Dry Step-Off 322**—for cyanide copper and other plating work requiring an extremely adherent step-off.

**Unichrome Quick Dry Step-Off 323**—for chromium and other plating work requiring a step-off that can be peeled off after use.

**Unichrome Resist**—a solid insulating material for constructing composite racks, step-off shields, insulating gaskets, etc.

#### Portable Dust Collector

A new design—entirely self-contained and portable dust collector for grinders, sanders, abrasive discs and cut-offs, polishing lathes, etc.—is added to its line of Dustkop dust collectors by Agat-Detroit Co., Dept. MF, 602 First National Bldg., Ann Arbor, Mich.

Of the recirculating type, the new Model 420, a radical departure in design from the previous drum type filter models, features a cyclone separator, motor driven multiple blade fan, large dust storage bin, and flat, spun glass filter, all contained in a single all-steel, fire-safe unit. Advantages claimed for the new design are: Considerably increased efficiency resulting from the use of a cyclone separator to separate out of the air stream the majority of dust and dirt; a larger dust storage compartment and the new design flat type spun glass filter that can be "shaken down" quickly with the

crank as required. Renewal of filter material can be accomplished in a few seconds.

Dust and dirt drawn in from the source first enter the cyclone separator where most of the dirt is removed; the flat filter, which comprises the entire top of the Dustkop, removes the balance of the dust and dirt, returning the cleaned air to the working space.

Measuring 12" x 22" x 24" (height) the new Model 420 can be placed in extremely limited space behind a grinder or beside it. Installation requires no tools and is usually merely a matter of slipping the flexible metal hose (usually 3-inch diameter for double-wheel grinders up to 6-inch diameter) onto the inlet sleeves of the dust collector and connecting hose to the dust outlet of the grinder.

The dust storage compartment is the size of the entire base of the machine. Thus, emptying is required infrequently, even on average, reasonably heavy duty use. The plate

on the front of the Model 420 is removed to empty the collected dust.

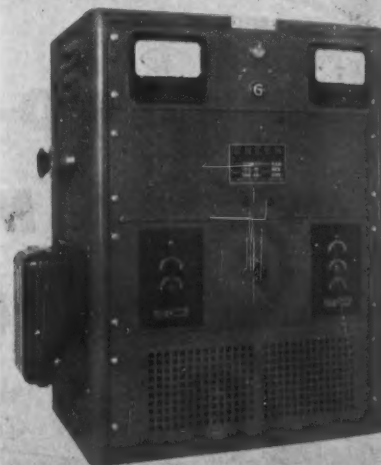
Power to provide the suction (which is rated at 420 cfm with a 1-inch static suction in a 5-inch pipe) is supplied by a multiple blade fan driven by a 1/4 hp continuous duty 3,450 rpm motor, the latter being available to suit virtually any 60 cycle power supply.

Access to the motor for oiling or other inspection is at the back of the machine which is open to permit ready accessibility.

#### Low Voltage Rectifiers

Green Electric Co. announces further advance in the rectifier field—stabilized equipment with low voltage high current output.

The unit illustrated is rated at 200 amperes, voltage range zero to 3 volts. Any voltage selected in range is maintained to



within 50 millivolts over load variation from zero to 200 amperes, and with line voltage variation of plus or minus ten percent.

Voltage stabilization system includes motor-driven Powerstat and simple electronic pilot device. Principle is widely applicable to larger or smaller rectifier units.

Descriptive data available from Green Electric Co., Dept. MF, 130 Cedar St., New York City.

#### Descaler

Pennsalt PM-90, a specially prepared acid cleaning and descaling compound, has recently been developed by the Research and Development Department of the Pennsylvania Salt Manufacturing Co.

Pennsalt PM-90 contains addition agents for surface action and inhibition. It is primarily used as a pickling bath concentrate in electroplating shops and as an acid cleaner for removing water scales from boilers and industrial equipment.

Packaged in 115 lb. returnable carboys, Pennsalt PM-90 is available in commercial quantities through the Special Chemicals Division of the Pennsylvania Salt Manufacturing Co., Dept. MF, Philadelphia 7, Pa.

#### Safety Pump

A new hand operated suction pump built of an inert plastic is announced by the manu-



facturer, The Alden Speare's Sons Co., Dept. MF, 156 Sixth St., Cambridge, Mass.

Designed primarily for the safe handling of acid, it attaches to acid carboys of from 5 to 13 gallons inclusive. It will withstand constant immersion in practically all grades and kinds of commercial acids. Quickly and easily installed, it eliminates the hazard of juggling heavy carboys.

### Electrical Instruments

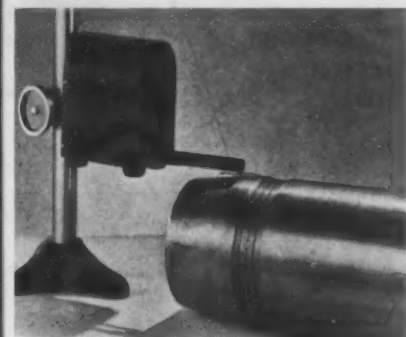
Norton Improved Electrical Instruments embody shock resistant features, important where accurate readings and long life are needed. Switchboard Ammeters and Voltmeters, in both round and square types can be furnished.

These rugged instruments, built to strict standards of accuracy, are cased in pressed steel and mounted on a base of BM 1132 High Impact Bakelite. The current-carrying mounting studs are rigidly locked in the Bakelite base, entirely preventing any twisting motion which might upset the delicate balance of the movement, either electrically or mechanically. Catalog available on request to The Norton Electrical Instrument Co., Dept. MF, Manchester, Conn.

### Measuring Head

The Brush Development Co., Dept. MF, Cleveland, Ohio, has announced a new Rough-Finish Measuring Head. This will meet the need for checking the rougher surface finishes and waviness in metals, glass, plastics, plated and painted materials.

With the trend towards more rigid specifications and tolerances, particularly on turned



surfaces, the new Rough-Surface Analyzer makes a perfect complement for the original Brush Surface Analyzer.

The new Pickup and Drive Head accurately measures irregularities from 100 to 3,000 microinches, peak to valley. It thus extends the use and range of the Brush Surface Analyzer from 1 to 3,000 microinches. The company is now on production on this item.

### Pickling Inhibitor

A controlled pickling inhibitor recently developed by Kelite Products, Inc., Dept. MF, 909 E. 60th St., Los Angeles 1, protects metal and saves acid by causing the pickling acid to work on the scale only. It prevents attack on healthy metal and reduces the possibility of hydrogen embrittlement.

The new inhibitor, trademarked as "Kelite Control," is a reddish brown liquid soluble

in either sulphuric or muriatic acid. It is packaged in 5 gallon cans and 15 and 55 gallon drums.

### Plastic Pipe Seals

Plastic Pipe Seals and Thread Protectors in countersunk pattern are now announced by American Molded Products Co., Dept. MF, 1644 N. Honore St., Chicago 22, Ill. This company pioneered seals and protectors in plastic, of the squarehead pattern. Due to demand for the countersunk type this addition to the line now gives users a choice, as the squarehead patterns are still available.

The strength and lightness, as well as the toughness of plastic make it preferred material for pipe seals and thread protectors, in wide demand and astonishing quantities for today's requirements. Plastic takes accurate and durable threading, is non-corrosive,

dielectric, and most efficiently excludes moisture, oil, dirt, grit, etc.

The square sockets of the new countersunk pattern are of dimensions to fit commercial square bars of standard sizes. Dimensions are the same as the maximum size of cold rolled square steel bars given in A.S.T.M. Specifications.

Sizes available in  $\frac{1}{8}$ ",  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", 1".

Further information may be had by addressing the manufacturer.

### Balancing Ways

The Ideal Commutator Dresser Co., Dept. MF, 1941 Park Ave., Sycamore, Ill., announce a new line of Super Sensitive Balancing Ways that are said to revolutionize static balancing operations.

Through the use of "Scale type" bearings in the small 10" size sensitivity to .007 ounce inches is made possible. Special sensitive

## OF THE 12 MICCRO COATINGS

One or More IS EXACTLY SUITED TO YOUR NEEDS



5 MICRO-SUPREME  
STOP-OFF LACQUERS  
MICCROLITE - MICCROFLEX

These Miccro rack coatings have been developed to do specific jobs. Very intricate racks, for instance, require a material of high solids and low viscosity. A simple single spline rack could be dipped in high viscosity material which would build up the film much faster even though each coat would require longer drying time. Different types of plating baths necessitate the use of different coatings. • Whatever your rack coating problems may be, you'll find the answer in one of these Miccro Products.



2 MICRO-SUPREME  
STOP-OFF LACQUERS  
MICCROME IN THREE COLORS

To meet every need for masking of parts prior to hard chrome plating or selective hardening, Michigan Chrome and Chemical Co. produces Miccro-Supreme Stop-Off Lacquers in two colors (red and black) and Miccrome in three colors (red, blue and green). Among the principle characteristics of these coating materials are unexcelled protective qualities, excellent adhesion, and good dielectric strength. Each can be quickly and easily applied and removed.

Full information on all of these products is yours on request

**MICHIGAN CHROME & CHEMICAL CO.**  
6348 EAST JEFFERSON • DETROIT 7, MICHIGAN

## ANNOUNCING

# Pen-Tape

### The ELASTIC, FLEXIBLE Masking Tape for Every Plating Plant Requirement

IN durability, insulating quality, economy and ease of application, Pen-Tape is unequalled for both insulation of plating racks and masking of parts for selective plating. Note these features:

- ★ The most elastic and flexible material of its kind. Very easily applied; conforms to irregular contours; wraps snugly around shoulders, etc.
- ★ Can be pulled out to more than twice its original length, giving unusual economy from the standpoint of coverage. Will not break or tear.
- ★ Effectively resists ALL plating and cleaning solutions, and withstands rough handling. Remains tough and flexible; does not harden, crack or oxidize.
- ★ Made by precision calendering process (not extruded); hence is uniformly thick and perfectly smooth throughout, assuring flat, leakproof overlap and minimum drag-out of solutions.
- ★ Available in any width desired. Regular width is  $\frac{3}{4}$ ".

# Pen-Tube

### For Quick Insulation of Plating Rack Contact Wires

PEN-TUBE is made of the same material as Pen-Tape but is tubular in form and is very quickly slipped into place. Regularly available in sizes from  $\frac{1}{16}$ " to 1" I.D.; other sizes on application.

PEN-TAPE AND PEN-TUBE can be applied quickly by anyone and used immediately on rush jobs. For permanent insulation of racks in production use, these materials are fused into a smooth integral covering by heating at 260° F. for just 20 minutes. Repairs become an integral part of the covering.

For full details on these NEW materials, write for descriptive bulletin. No obligation of course.



**PENINSULAR CHEMICAL PRODUCTS CO.**  
6795 EAST NINE MILE ROAD  
VAN DYKE • MICHIGAN

bearings used in the 20" and 42" size permit accuracy in balancing to .009.

The work is carried on free turning discs, mounted on precision bearings. Discs are ground on outside diameters, mounted on ground spindles and balanced with extreme care.

Standards supporting the revolving discs are movable on shafts to take different lengths of armatures within the capacity of the machine. Maximum strength and rigidity are obtained through the use of solid end castings.

Ideal Balancing Ways simplify static balancing, straightening and truing operations of parts such as fans, pulleys, fly wheels, crank shafts, grinding wheels, armatures, etc. Four sizes are available, 10", 20", 42" and 60" swing.

## Business Items

His many friends in the company and the electroplating industry will be pleased to know that Nelson Todd has rejoined the Hanson-Van Winkle-Munning Co., of Mawan, N. J., as Assistant to the President. He has been re-elected a director in the company.

The appointment of J. O. Low, Jr., as Reynolds Metal Co.'s assistant division manager for Illinois, Indiana and Iowa has been announced in Chicago by J. F. Van Kernen, central division manager.

Mr. Low, who has been with the firm for the past two and one-half years will make his headquarters at 400 N. Michigan Ave. A



J. O. Low, Jr.

graduate of William College, Williamstown, Mass., Mr. Low formerly was a sales representative for the Bethlehem Steel Co. and the Jones and Laughlin Steel Corp., of Detroit, Mich.

Organization of the Tanner Chemical Co. for the manufacture of industrial chemicals for rustproofing processes, has been announced by Robert R. Tanner, president.

The firm is located at 109 East Nine Mile Road, in Ferndale, with laboratories in Berkeley, Mich.

Robert R. Tanner, a well-known figure in the rustproofing field, was formerly director of research for Parker Rustproof Co., from which concern he resigned last December. He is known as the inventor of the Bonderite process, as well as some twenty other patents in the rustproofing field. Before entering this industry in 1928, he was instructor in chemistry at the University of Michigan. He is a member of Sigma Xi, Alpha Chi Sigma, Phi Lambda Upsilon, Alpha Tau Omega, Gamma Alpha and American Chemical Society.

Mr. Tanner announces that the principal product of his new organization will be "Tannerite" and the process will be known as "Tannerizing." According to Mr. Tanner, "the process produces phosphate coatings on various metal surfaces and offers many advanced features in effectiveness and efficiency."

The Pemco Corp. has just released for general use by the porcelain enamel industry a new slogan, "The Dirt WIPES Off—But the Finish Remains." Pemco has placed no restrictions to its use except that it should be used only in connection with porcelain enameled products. It is felt that the new slogan not only embodies the good features of "as easy to clean as a china dish"—the permanency of "the lifetime finish" as well as the descriptive phrase "glass fused to metal"—but does it in a way that is easier to remember. It is felt that the slogan will find ready acceptance in the industry.

Veteran employees of Maas & Waldstein Co. were honored at a party on the firm's premises, 438 Riverside Ave., Newark, on June 9. The guest of honor was John Weber, 73, of Bloomfield, New Jersey, who has spent fifty years with the company. He now supervises the handling of nitrocellulose, which is used in lacquer production. G. Klinkenstein, Vice-President of the company, presented Mr. Weber with a fifty-year service pin, a diamond ring, and a \$500 year bond. He also awarded gold watches and 25-year service pins to five other employees.

Robert R. Miller has been promoted to sales manager, industrial trades, and W. J.



Robert R. Miller



W. J. Streicher

Streicher to sales manager, distributor trades, in the Cincinnati territory, it is announced by George H. Halpin, Minnesota Mining & Manufacturing Co. vice-president and general sales manager.

Mr. Streicher, a salesman in the Indiana territory at the time of his promotion, has been with 3-M Company for 17 years. He will assume responsibility for all salesmen handling abrasives and related items in that

# RECONVERSION!

## Specify LIONITE



### for FAST, EFFICIENT, LOW COST POLISHING

With the return to civilian production, you are faced once more with the problem of doing the best possible polishing job at minimum cost. That's where you need LIONITE.

LIONITE Abrasive Grains are tough, long-lasting grains of electric-furnace aluminum oxide. With their polyhedral shape and their sharp, strong cutting points, they cut fast and wear down slowly. They are free from unproductive flats and slivers. Use the right type of grain for the job. For glue, specify CBT LIONITE. Where cement is used, order NB LIONITE.

Users report surprising reductions in cost and increases in production when they change to LIONITE. Ask to have a LIONITE representative go over your polishing operation. His recommendations may develop important savings.

#### GENERAL ABRASIVE COMPANY, INC.



Lionite and Carbonite Abrasive Grains  
NIAGARA FALLS, NEW YORK, U. S. A.



# FAST AIR-DRYING

**BUNATOL**—the easy to apply air drying rack insulation.

There is no argument about the great savings when using a rack insulation that requires **NO BAKING**. Saves time and money.

**BUNATOL** is a tough, glossy insulation that lasts for a great many plating cycles. It rinses freely and does not carry over solutions. Made to stand high temperature cleaners and built-in chemical resistance for acids and alkalis.

If you are not acquainted with **BUNATOL** rack insulation send us one of your racks and let us insulate and return to you promptly for testing (no charge of course). Then you will see why **BUNATOL** insulation has the lowest cost-per-hour of use.

**NELSON J. QUINN COMPANY**  
TOLEDO 7, OHIO

**160 BUNATOL 720**

part of the Cincinnati division included in the states of West Virginia, Kentucky, Tennessee, Alabama and Georgia.

Mr. Miller, a 3-M employee for 21 years and recently a salesman in Ohio, will remain in that territory in his own supervisory capacity.

Charles W. Yerger, for a number of years vice-president in charge of sales for the *Hanson-Van Winkle-Munning Co.*, of Matawan, N. J., and more recently executive vice-president, has retired from the company.

Mr. Yerger's ability and warm personality gained him the respect and affection of all his associates in the H-VW-M Co. He leaves with all their good wishes.

*Technic, Inc.* was recently organized by the staff which for years produced and serviced an outstanding line of metal finishes and services. This line has been considerably expanded and modernized to the point where today *Technic* represents one of the largest enterprises of its kind in the U. S. A. serving the metal and jewelry finishing industries.

This capacity includes a complete metal finishing service covering consulting, analytical, research and engineering work, as well as specification testing, plating room design and salt spray testing.

Completely modern laboratories, together with an experienced, well-trained staff are responsible for the quality and scope of

*Technic* manufacturing and service operations.

Products include: Trushade 24K Soluble Gold (aqueous), White Brass, Antique Smuts, Black Finishes for Brass, Copper and Silver, Soluble Hard Gold Alloy (aqueous), 14K Soluble Gold Alloy (aqueous), Flame Flux, Wetting Agents, Pink Soluble Gold Alloys, Soluble Green Gold Alloy, Immersion Tin, Gold Strip, Aluminum Pre-plate and Protectox (invisible oxide).

Complete information on any *Technic* product or service is available. Write direct to *Technic, Inc.*, Dept MF, 39 Snow St. Providence, R. I.

Announcement is made of the appointment of Mr. Richard O. Loengard as president.



Richard O. Loengard

dent of *United Chromium, Inc.* and Messrs Theodore G. Coyle and Hugh D. McLeese as vice presidents. All three men, well known in the electroplating and metal finishing field, have been associated with the company since its inception. Messrs. Coyle and McLeese will continue as Technical Director and General Sales Manager, respectively.

Mr. Kevie W. Schwartz, who has resigned as vice president, will continue to make his services available to the company as a consultant on patent matters.

The opening of district offices by *United Chromium* in Chicago and Dayton has recently been announced and plans are being made for a new office on the Pacific Coast. In addition to the laboratories and offices maintained at Detroit, Mich., and Waterbury, Conn., a new plant is now being equipped at Carteret, N. J., for the manufacture and development of the company's products.

*The Chemical Corp.* has employed Mr. William E. Flint as one of its salesmen handling industrial chemicals. Mr. Flint was formerly chemist at the *American Hardware Co.* of New Britain, Conn.

The Corporation has purchased a building at 54 Waltham Ave., Springfield, Mass. It contains approximately 48,000 square feet. There are six floors which makes it ideally suited for warehousing and manufacturing purposes.



Allen W. Schmidt

Allen W. Schmidt has been appointed sales promotion manager of Kelite Products Inc., Los Angeles, manufacturer of specialized cleaning and processing materials. He was formerly employed in the production of promotional and technical literature for Little & Co., Los Angeles advertising agency, and began his career in the graphic arts with R. R. Donnelley & Sons Co., Chicago.

In a move to assist fabricators of stainless steel to prepare for production of civilian goods, the Rustless Iron and Steel Corp. of Baltimore has announced it is making available at once, and at no cost, electropolishing demonstration units using the Rustless patented process.

Purpose of loaning these units is to assist interested fabricators to evaluate a practical and proven electropolishing process in their own plants. Rustless engineers will direct installation of the models and assist in the initial use of the citric-sulphuric process which in five years has demonstrated its value as a production tool, particularly applicable to the finishing of complex formed and welded wire products and other small items difficult to finish mechanically.

The units will be distributed to interested manufacturers of stainless steel articles after samples of the individual items have been treated at the Rustless plant in Baltimore, and it is determined that it is practical to electropolish them.

The demonstration unit is a lead-lined tank of treated wood with inside dimensions 6 by 18 by 12 inches. It has two cathode bars and



**MANY  
HAPPY  
RETURNS  
For your Rack**



**UNICHROME\***  
**COATING 202**

**Provides extra stamina for severe plating cycles**

Extremely corrosive solutions, anodizing baths and severe cycles need not shorten the useful life of your racks. Not, if you switch-over to Unichrome coating 202. That's because it is compounded of special, improved resins that give it utmost chemical resistance, unusual toughness and superior adherence. And, force drying for which it was developed fortifies these desirable qualities.

Hard-to-get as these resins are today, no substitutions have been made in our formula. So you can start your racks toward a longer, more profitable life, by ordering a trial shipment now. Our nearest office will gladly give you information and prices.

\*Trade Mark Reg. U.S. Pat. Off.

**UNITED CHROMIUM, INCORPORATED**

51 East 42nd St., New York 17, N.Y. • 2751 E. Jefferson Ave., Detroit 7, Mich. • Waterbury 90, Conn.

**PROPERTIES**

**Chemical Resistance**—Excellent for all plating cycles.

**Toughness**—Withstands repeated flexing and shop handling—cuts cleanly and easily at contacts.

**Drying**—Dipped at room temperature in container in which it is shipped—force dried at 200°F. for extra protection.

**Adherence**—Excellent for severe cycles. For moderate cycles Air-Dry coating is recommended.

**TRY THESE OTHER UNICHROME MATERIALS**

**Unichrome Air-Dry Rack Coating 203**—a rack insulation that can be dipped and dried at room temperature, for use in all plating solutions.

**Unichrome Quick Dry Stop-Off 322**—for

cyanide copper and other plating work requiring an extremely adherent stop-off.

**Unichrome Quick Dry Stop-Off 323**—for chromium and other plating work re-

quiring a stop-off that can be peeled off after use.

**Unichrome Resist**—a solid insulating material for constructing composite racks, stop-off shields, insulating gaskets, etc.

one anode bar, and the item to be electropolished is attached to the anode bag. Included are a relay for temperature control of the bath, a temperature regulator, an ammeter, and a heater. Components of the solution, which is restricted to the electropolishing of stainless steels, are 15-20 percent sulphuric acid, 55-60 percent citric acid, and 20-30 percent water. About 5.83 gallons of solution are used in the model units.

Rustless, largest exclusive producer of stainless steels in the country, primarily is interested in expanding the usefulness of its products and this is the motive behind distribution of the model units, the company reported. Inquiries about these electropolish-

ing units, and others of larger size to be built later, should be directed to the Market Development Division, Rustless Iron and Steel Corp., Dept. MF, Baltimore 13, Md.

Rheem Research Products, Inc., Baltimore, has appointed Mr. J. C. Baker to represent the company and its product, Iridite, in the eastern Ohio-western Pennsylvania-West Virginia territory. Mr. Baker was formerly associated with the Black Industries, Cleveland, as Production Controller and Director of Purchases, and is widely known to industrial executives throughout the territory.

## Ingenious New Technical Methods

Available Now to Industry in General



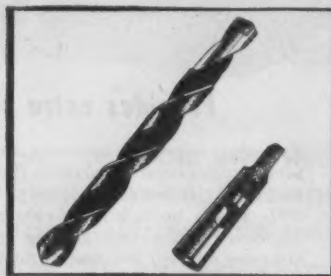
### New Shankless Roll-Forged Drill is Faster, Tougher, More Economical

Developed by Ford for wartime uses—available now to industry in general. "More holes at less cost," is the claim for this ingenious new Shankless high speed drill—made in two parts—the drill itself, and a removable taper shank, known as the "drill driver." By this separation, costs to the user have been cut 20% to 30% under conventional taper-shank drills. In the conventional drill, the shank must be discarded when the point and flutes are worn out. Here, however, the drill driver is used throughout the lives of many drills. Shankless drills are roll-forged and twisted, unlike the machined manufacture of ordinary drills, for improved structure.

Principal advantages are (1) Lower first cost. (2) Greater hole production because of greater strength. (3) Reduced breakage with tough "shock-absorber" neck. (4) Greater length of usable flute. (5) Greater scrap recovery value of unused portion of drill.

Warlike advantages of Wrigley's Spearmint Gum show how this quality product, too, can help industry—once it again becomes available. In the meantime, no Wrigley's Spearmint Gum is being made; and none will be made, until conditions permit its manufacture in quality and quantity for everyone. That is why we ask you to "remember the Wrigley's Spearmint wrapper," as the symbol of top quality and flavor—that will be back!

You can get complete information from Republic Drill & Tool Co., 322 S. Green St., Chicago 7, Ill.



Shankless Drill and "Drill Driver"



Remember this wrapper

Z-78

## Courses In Electroplating

THE Institute of Electrochemistry and Metallurgy, 59-61 East Fourth St., New York City, will offer specialized courses in the field of electroplating and metallurgy during 1945-1946. Registration will be held for the Fall term from September 17 to September 21 and the first class will be held on September 24.

The following studies will be offered:

### Electroplating I.

The course is designed to give the electroplater or industrial worker a foundation in chemistry including qualitative and quantitative analysis. One hour each evening will be devoted to class lectures in which will be discussed the theories of modern chemistry as applied to electroplating. The remaining hours will be devoted to the laboratory where the student will conduct his own experiments. Tuesday and Wednesday from 7:30 to 11:00 P. M. Dr. Young, Mr. Klinse and Mr. Bundy. Fee \$45.00.

### Metallurgy I.

The student will be introduced to the structure of metals and alloys and factors are

taken into account which affect these, such as temperature, mechanical working, etc. The application of the phase rule to physical metallurgy will be discussed. Both binary and tertiary systems will be studied and illustrated. Heat treating, surface treating and testing of metals and alloys will be studied. Tuesday and Wednesday, 8:30-9:30 P. M. Dr. Young, Mr. Klinse and Mr. Bundy. Fee \$30.00.

### Research I.

This course is designed to give the practical electrochemist a chance to investigate problems in his field. One half hour per week is devoted to a conference with the instructor in which the method of attack is laid out. The remaining time is spent in the laboratory where the student applies his knowledge and technique to the solving of problems which arise in such an investigation. Tuesday and Wednesday, 7:00-11:00 P. M. Dr. Young. Fee \$30.00.

Time payments may be arranged if desired. For further information call Dr. C. B. Young, ORchard 4-1778.

## Manufacturers' Literature

### Measuring Surface Resistance

The Frederick Gumm Chemical Co., Inc., manufacturer of Clepo Compounds, has issued a pamphlet on the Kelvin Bridge method for measuring the surface resistance of sheet aluminum.

The pamphlet shows the circuit used, describes the construction and operation, and lists the materials used in the construction of the bridge.

Copies may be obtained gratis by writing to Frederick Gumm Chemical Co., Inc., 538 Forest St., Kearny, N. J.

### Stoneware

An eight-page bulletin has just been issued by General Ceramics and Steatite Corp. covering the full line of its Chemical Equipment Division's high grade, acid-proof chemical stoneware. Described and pictured are ceramic bodies and apparatus possessing characteristics to meet a wide range of requirements in the chemical and process industries.

This bulletin illustrates not only the standard equipment which this company has always manufactured, but emphasizes their new line of completely engineered items and shows typical apparatus of this type.

Over 70 pieces of standard equipment are listed in alphabetical order, and a page is devoted to interesting examples of special order work, shown in sectional views. Copies of this bulletin will be sent if requested on company letterhead and addressed to General Ceramics & Steatite Corp., Chemical Equipment Division, Dept. MF, Keasbey, N. J. Ask for Bulletin Ch. E-R.

### Airless Wheelabrator Tables

Just published by American Foundry Equipment Co., Dept. MF, 555 S. Byrkit St.,



Michawaka, Ind., are five individual catalogs on their complete line of airless Wheelabrator Tables, both Multi-Rotary table and Plain Table types.

The Multi-Table machines are supplied in sizes ranging from twelve 8 in. diameter tables to four 66 in. diameter tables. Plain table machines are supplied with 6 ft. to 12 ft. diameter tables.

A catalog on the size machine suited to individual requirements will be mailed postpaid upon request.

#### Coated Abrasive

To acquaint coated abrasive users with the newly announced system for identifying coated abrasives by "Carborundum," The Carborundum Co. has prepared "Sanding and Finishing," an 84-page book containing information about coated abrasives, including a complete explanation of the new system and new End Use names for all coated abrasive products. Also there are comprehensive recommendations for the use of coated abrasive products in metalworking, woodworking, shoe and leather, floorsanding, printing, plastics, pipe and hat trades, specifications for belt sanding, belt splices and speeds.

"Sanding and Finishing" is available to all bona fide industrial users of coated abrasives, simply write on your business or company letterhead to The Carborundum Co., Dept. MF, Niagara Falls, N. Y.

#### Aluminum Pre-Cleaner and Deoxidizers

Optimus Detergents Co., Dept. MF, 126 Church St., Matawan, N. J., manufacturers of industrial metal parts cleaners, announces the introduction of Optimus Aluminum Pre-Cleaner and Deoxidizers. Their use permits the producing of low surface resistance on aluminum preparatory to spot welding.

Among the advantages claimed are: a smooth surface, oxide removed using a cold solution, negligible weight loss, minimum machine adjustment and minimum handling. Shop dirt, cutting oil, grease and identification paint are easily and completely removed in the prescribed pre-cleaning operation.

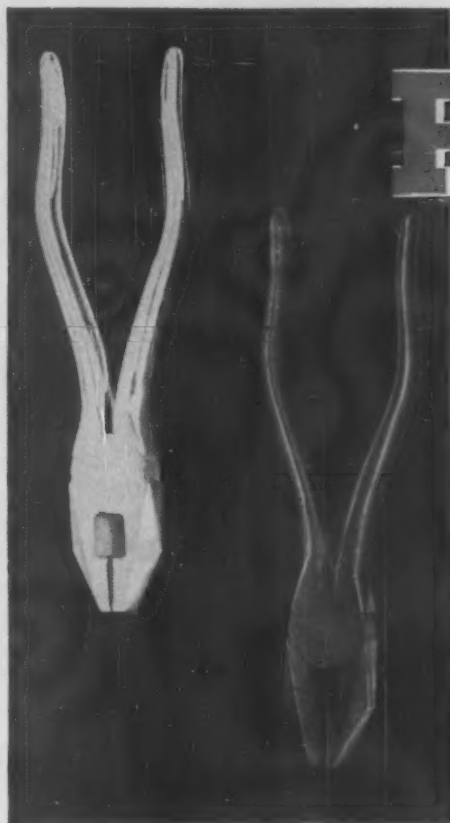
In addition, the aluminum is placed in condition for Alrok treatment, anodizing and painting. With the use of the proper method all classes of alloys are easily handled.

#### Melamine

A 24-page illustrated booklet describing the many applications of the chemical melamine, in the plastics, textile, paper, leather, chemical, paint and allied industries, has been published by the American Cyanamid Co., Dept. MF, 30 Rockefeller Plaza, New York 20, N. Y., which was the first company to recognize the tremendous possibilities in melamine and to make it available to American industry on a commercial scale.

The booklet is designed for popular appeal and supplements the numerous technical publications relating to the various applications of melamine and the chemical compounds in which it is used.

Among the more important applications of



# Powerful

## IS THE WORD FOR LUSTER-ON'S APPEAL

Wherever they're displayed, tools or parts treated with Luster-on® stand out. Laid beside ordinary zinc-plated parts they are different as day from night, as clearly shown in this unretouched photograph.

Yet Luster-on® is an inexpensive, easily-applied chemical bright dip for use on zinc—a simple, cold dip process that gives a passive surface, resistant to corrosion, age-stains, fingermarking or ordinary darkening. Luster-on® gives tools a chromium brilliance that catches the customer's eye—and a lasting protection that keeps him happy.

Luster-on® is a postwar zinc finish—available now in any quantity. It will put punch in your sales program.



#### KEMO SAYS:

Send us a sample of your zinc-plated items for free processing with Luster-on®. See the improvement with your own eyes.

\*Patent applied for

# THE Chemical CORPORATION

54 Waltham Ave., Springfield 9, Mass.

#### THE CHEMICAL CORPORATION

54 Waltham Ave., Springfield 9, Mass.

Please send me full particulars about Luster-on® bright dip for zinc surfaces. I am (am not) sending sample part for free dip. No obligation, of course.

Name.....

Address.....

Metal Finishing, August



COMPOUNDS: Burring, Cutting Down, Polishing, Mirror Finishing.  
4A CEMENT: Used for setting up Wheels, Belts, Buffs & etc.

HARRISON & COMPANY, INC., Haverhill, Massachusetts

## CLEAN-RITE All-Purpose CLEANERS

ANODES  
BLACK OXIDE SALTS  
BUFFS  
CHEMICALS  
CLEANERS  
COMPOSITIONS  
ELECTROPLATING EQUIPMENT  
LACQUERS  
PLATING RACKS  
POLISHING EQUIPMENT  
POLISHING WHEELS  
SOLDER FLUX  
STOP OFF MATERIALS  
TANKS

### PLATING ROOM SERVICE

Let us help you solve your problems.  
Take advantage of our practical experience.

## JACOB HAY COMPANY

Centralized Distributors

4014 WEST PARKER AVE.

CHICAGO 39, ILL.

TEL. ALBANY 2742



## Cleaning Metal Surfaces the PERMAG Way

- Highly efficient
- Fast in action
- More economical
- Produces chemically clean surfaces
- Does not injure soft metal surfaces

Reconversion plans in the electroplating field will doubtless bring out new finishing problems. Our Technical Service can give you valuable aid. Call for it. Interviews place you under no obligation.

### MAGNUSON PRODUCTS CORP.

50 Court Street

Brooklyn 2, N. Y.

In Canada: Canadian PERMAG Products Ltd.  
Montreal-Toronto

## PERMAG Cleaning Compounds

melamine are its use in plastics of high resistance; in wet-strength paper; in the shrinkage control of wool; in making improved leather, and especially leathers which are white all the way through; in water repellents for fabrics; in improved enamels suited to mass production of automobiles and household appliances, and in the production of the chemical equivalent of distilled water. Copy of the booklet will be sent by request.

### Synthetic Rubber

A new edition of its catalog section on the properties of Ameripol D, an oil and heat resistant synthetic rubber which it develops for specialized applications, has just been published by The B. F. Goodrich Co., Dept. MF, Akron, Ohio, and is now available upon request.

Properties of Ameripol D are outlined in detail. One of the features is a page tab giving the property relation of natural and various types of synthetic rubber. Other tables list the properties of typical commercially available Ameripol D compounds, the per cent volume increase after 48 hours immersion in oil of natural rubber and the various types of synthetic rubber, and a guide to determine where the use of Ameripol is practical. The section is illustrated with Ameripol D products of various types.

## News from California By FRED A. HERR

Activity by the metal finishing industry and allied crafts in Southern California to get ready for the postwar period was accelerated during June and July by the announcements of new plants, shop and factory additions by a large number of concerns in Los Angeles and contiguous communities.

Plans totaling \$126,300 for new plant additions were announced during the past weeks. These were exclusive of several other projects for which no cost figures were disclosed; such as *Gene's Plating Works*, which reported that priorities have been granted for a new factory building to be erected on 22nd and Spence St., Los Angeles, measuring 40 by 89 feet in size.

Simultaneously, *Advance Aluminum and Brass Co.* disclosed plans for a new 50 x 100 foot factory at 1001 East Slauson Ave., Los Angeles; and *Capitol Brass Foundry* for addition to its plant at 1822 East 58th St.

*H. B. Jameson* has construction under way on a one-story building costing an estimated \$2,000, at 11757 Vose St., in the Van Nuys district of Los Angeles, which he proposes equip for plating operations.

*Woods & Sabella Metal Polishing Co.* is erecting a plant addition at 804 East Florence Ave., 40 x 80 feet in area, at a cost of \$7,800.

*Cast Metals Specialties Co.* has announced plans for a new 15 x 107 foot building costing \$3,500, at 3474 Union Pacific Ave., Los Angeles, for use in metal finishing and processing work.

# METAL DEGREASING

## PENOTRITE

- ✓ REMOVES GREASE AND OIL FROM METAL PARTS
- ✓ PRODUCES CLEAN PARTS READY FOR INSPECTION
- ✓ REDUCES REJECTS BY REMOVING OIL AND GREASE FROM INACCESSIBLE PLACES
- ✓ LOWERS RISKS OF DAMAGE TO DELICATE WORK
- ✓ CAN BE USED ALONE OR IN PRODUCTION LINE
- ✓ CONSUMES SMALL QUANTITIES OF SOLVENT
- ✓ EASY TO OPERATE, CAN BE USED IN EXPENSIVE TANK EQUIPMENT
- ✓ A TIME AND COST SAVER
- ✓ CAN BE USED AT ROOM TEMPERATURE
- ✓ AVAILABLE FROM MANY ACCESSIBLE WAREHOUSE STOCKS.

**GENERAL SOLVENTS COMPANY**  
INCORPORATED

926 EXCHANGE ST.

ROCHESTER, N. Y.

## The ABBOTT Method

★ TEST WORK REPORT  
on your parts

PRODUCES RESULTS

# TRY IT!

IT'S AN EFFICIENT METHOD OF

# DEBURRING

★ TEST WORK REPORT

Send a few unfinished samples  
of the parts to be Deburred and  
get our Test Work Report . . .  
it's gratis and gives the facts.



**THE ABBOTT BALL COMPANY** 1046 NEW BRITAIN AVE  
HARTFORD 10, CONN

Among the larger of the projects for new buildings is the expansion program of *Barker Grinding Co.*, which has started construction of two new buildings costing a total of \$5,000 at 5015 Pacific Blvd. The building program includes a 100 x 120 foot warehouse and a 36 x 37 foot office structure.

*Pacific Solvents Co.* has let contracts in amount of \$35,000 for construction of a new factory at 1522 North Fishburn Ave., Los Angeles. The building will measure 73 x 100 feet in area and be equipped with a 10,000 and a 15,000 gallon reinforced gunite tank.

Work was started early in July on a 75 x 125 foot building costing \$25,000 for *Modern Metal Fabricators* in Vernon, Calif. *Union Die Casting Co.* is erecting a \$2,000 factory addition at 2313 East 51st St., Los Angeles.

*Kelite Products, Inc.*, Los Angeles, has announced completion of a new plant for pro-



Earl Lester

duction of cleaning and processing chemicals in Dallas, Tex., to supplement production at the Houston, Tex., plant. Headquarters for the southwest division of the company have been moved from Houston to Dallas, with Earl Lester as divisional manager, Roy South as plant superintendent, and F. J. Oxspring as foreman.

Anthony Zarilla, 42, foreman of the *Sisto Plating Co.*, 1317 East Florence Ave., Los Angeles, was burned to death in a fire of undetermined origin which, on June 25, caused damage of \$40,000 to the plants of the plating firm and the *Union Die Casting Co.* at the same address.

Mr. Zarilla's body was found in an office at the front of the plating plant where he apparently was trapped by the fire while hanging his clothes. The blaze is believed to have started near the door of the room in which Mr. Zarilla was burned to death.

D. F. Sisto is the proprietor of the *Sisto Plating Co.* The *Union Die Casting Co.* occupied leased quarters in the building since its former plant in Vernon was destroyed by fire in February.

Activity at the *General Electric Co.*'s "Hot-





In the new Globe Tumbling Barrel Catalog, partially illustrated above, you will find the final solution to your finishing problems. It contains complete information about the nine different types of Globe Barrels in their various sizes and capacities. You will find that there is a Globe Tumbling Barrel for almost every type of finishing operation—de-burring, burnishing, polishing, painting, japanning, or drying. All of them are designed to provide finer finishing at less cost. This new catalog plus Globe's Finishing Service Department are waiting to serve you. Write today!

**Here Are Seven Ways That Globe Tumbling Barrels Will Reduce Your Finishing Costs**

1. You can process thousands of pieces at one time.
2. You do not need specially skilled labor.
3. One man can operate several barrels simultaneously.
4. The purchase price of Globe barrels is low.
5. You have practically no upkeep.
6. Your operating expense is mainly power consumption which is negligible.
7. You obtain superior results.



# NICKEL SULPHATE

Exceptional Purity

LOTTE CHEMICAL CO. INC.

Manufacturers

PATERSON

NEW JERSEY

point" plant at Ontario, Calif., reflected the gradually improving situation which has taken place with the victory in Europe. This firm, which operates one of the largest metal finishing departments in California, turned out 119,000 electric irons during the second quarter of the year, ending June 30, the largest job on civilian items it has handled since the war began.

James P. ApRoberts, formerly a process engineer with Lockheed Aircraft Co. and a research man for Turco in Los Angeles, in July enrolled in the Colorado School of Mines, Golden, Colo., for supplementary work in metallurgy and chemical engineering. Jim was honorably discharged from the Navy in May after 18 months' service as an inspector of material.

Platers of Southern California are considerably interested in a new exhibit and technical library recently opened in Los Angeles by Edward S. Christiansen Co. in which emphasis is placed on aluminum and magnesium.

Mr. Christiansen, who is president of the Magnesium Association, New York, is sponsoring the project. The exhibit contains samples of aluminum and magnesium raw materials in their various forms, semi-fabricated castings and wrought parts, as well as finished assemblies. The displays will be changed at intervals to provide a showing of the widest variety of materials, parts and assemblies to indicate the trend of conversion from war production and war use to civilian application.

The technical library is being developed to cover all subjects relating to the technology, processing and finishing of light metals, their fabrication and use.

ANSWER KEY  
T-F-T-F-F-T-F-T-F-T

## Eager Beaver



## Associations and Societies

### American Electroplaters' Society Los Angeles Branch

With no regular monthly business and educational meetings of the branch as a whole scheduled during July and August, the membership and arrangements committees of the Los Angeles Branch, A. E. S., held a number of committee conferences during the summer to prepare for the big open house session with which the branch proposes to launch its fall sessions on the night of September 10.

President E. W. Wells, Howard Woodward, chairman of the membership committee, and the other officers and committee members have in preparation a program designed to attract to the September meeting a record-breaking attendance. The objective is to break the record of attendance established at a meeting several years ago when the branch had as its guest of honor Supreme President Frederick Fullforth.

The branch has set a goal of 200 total members by the close of the 1945-6 fiscal year, with 151 members of record in June, and the branch officers consider it well within the realm of possibility to obtain 49 new signatories. With this goal in mind, the committee has mapped plans for inviting to the opening meeting in September the operators of all plating shops within the Los Angeles area who do not at present hold membership in the A. E. S. Plant operators also are to be requested to bring along all employees who are eligible for membership. The committee, through Mr. Woodward, announced that one, possibly two, outstanding speakers on timely subjects pertinent to the field of metal deposition will be presented at the meeting to demonstrate to the prospective new members the educational value of membership in the A. E. S.

Ernest Lamoureux, sponsor of the Lamoureux Award contest, through which he has presented an attractive trophy for several years to the author of the best paper read

# ONE does the job when you use Gripmaster!



### One Grade Grips All Grains — 250 to 20 .

**NO NEED** for your polishers to get their heads in a whirl trying to figure out which grade of polishing wheel adhesive to use on what grain. Gripmaster ends "grade-itis" because one grade does every job. What's more, Gripmaster doesn't glaze on the wheel—thanks to a secret new high-heat resisting ingredient. So switch to Gripmaster! Step up efficiency, boost production—an average of 47% more pieces per head! Jobbers in principal cities.

FREE SAMPLE  
NO OBLIGATION. SEND ON  
YOUR COMPANY LETTERHEAD  
TODAY!

## GRIPMASTER

PAT. PEND.

### POLISHING WHEEL CEMENT

GRIPMASTER DIVISION MICHIGAN BLEACH & CHEMICAL COMPANY  
12345 SCHAEFER HIGHWAY, DETROIT 27, MICH.  
IN CANADA: NELSON CHEMICAL COMPANY, WINDSOR, ONTARIO

## PUT RUST TO WORK!

Brush or spray Nobs Glazecoat directly on rust. Rust aids in forming a permanent thermo-plastic coating that is not affected by water, alcohols, dilute acids, or alkalis. Prevents further rusting. Stands heat to 400° F. Covers about 300 sq. feet per gallon.

PRICE . . . \$3.50 PER GAL. F.O.B. LOS ANGELES

### NOBS CHEMICAL COMPANY

2465 EAST 53RD STREET, LOS ANGELES, CALIF.  
Seattle San Francisco

## BUY

## UNITED STATES

## WAR BONDS

# CHROMIC ACID

## 99.75% PURE

With two complete, independent plants at Jersey City and Baltimore, and its own supply of the basic raw material Chrome Ore from company owned and operated mines, Mutual is the world's foremost manufacturer of Chromic Acid.



**Bichromate of Soda**  
**Bichromate of Potash**

**MUTUAL CHEMICAL COMPANY**  
**OF AMERICA**

270 MADISON AVENUE

NEW YORK 16, N.Y.

## PLATING RACKS by JOSEPH NOVITSKY

- We specialize in plating racks of our own patent.
- Constructed without screws, rivets, solder, brazing, welding.
- We design racks to suit your individual problem.

## JOSEPH NOVITSKY

Office: 104-17 199th St., Hollis 7, L. I., N. Y.  
(Phone—HOLLIS 5-6871)

Factory: 147-24 Liberty Ave., Jamaica 4, L. I., N. Y.  
(Phone—REpublic 9-7223)

before a branch meeting, is expected announce that the contest will be continuing for another year.

### News of Job Platers

According to a report from the *Masters' Electro-Plating Association*, 123 William St., New York, N. Y., the job plating industry has been very busy during the past year, in spite of the cutbacks and cancellations which have taken effect in war materials, job plating operations have continued at practically the capacity of the plants and the labor is obtainable. The greatest problem of the shops at this time is the shortage of skilled help.

The OPA has issued a regulation, MPR 581, calling for ceiling prices or methods of calculating ceiling prices on electroplating and other industrial services. Job platers from New York, Boston, Philadelphia, Cincinnati, Detroit, Chicago and Los Angeles were active in helping the OPA to set up a practical, workable regulation.

At the 32nd Annual Conference of the American Electroplaters' Society, in June 1944, a meeting of job platers was held which was attended by over 75 men from all over the U. S. Plans were laid to make this meeting an annual affair, which may in time result in the formation of a national association of job platers. The chairman of the 1944 meeting was E. J. Musick of St. Louis. The chairman for the next meeting will be R. O'Connor of Bridgeport, Conn.

The Masters' Electro-Plating Association of New York joined in a campaign during the past year for the control of business rents. As a result of this campaign, the New York State Legislature passed a law preventing excessive increases. The Masters' Electro-Plating Association also took an active part in helping to raise funds from the industry for the Red Cross, the National War Fund and the War Loan Bond Drive.

It is the purpose of this Association to continue to study and to educate its members in the practice of estimating and cost finding. This work will tie in closely with operation under the new OPA regulation MPR 581.

The *Plating Institute of Detroit*, 2236 Division Bldg., is a very energetic and useful organization, under the guidance of R. M. Shoenberger, executive secretary.

A new and active group of job platers has been formed in Massachusetts: The *Massachusetts Metal Finishers Association of New England Inc.*, with *Walter R. Guild*, as managing director.

### Correction of Address

Due to a typographical error the address appearing in the advertisement of *Granite Products* on page 22 is incorrect. The correct address is 2616 Downey Road, Los Angeles 11, California.





## THE SARCO FLOAT TRAP

The Sarco float-thermostatic trap delivers condensate in a continuous stream, as rapidly as it forms and without shock.

The mechanism is simple, powerful, self-cleaning and self-aligning, with fully automatic air by-pass. Air-binding is impossible.

Sizes  $\frac{3}{4}$ " to 2" for pressures 0 to 200 lbs. Balanced valves for extra large capacities. Ask for Catalog No. 450.

**SARCO** SARCO COMPANY, INC.  
475 Fifth Avenue, New York 17, N. Y.  
**SAVES STEAM** SARCO CANADA, LTD. 85 Richmond St. W., TORONTO, ONT.

182



## J. HOLLAND & SONS, Inc.

Electroplating and Finishing Equipment  
and Supplies

### MOTOR GENERATOR SETS

All Sizes and Types

Rheostats 50-1500 amperes with or without meters.

### V-DRIVE POLISHING LATHES

Sizes 3-15 horsepower. Complete unit is ball-bearing, totally enclosed, Sturdy construction.

### SPRAY PAINTING EQUIPMENT

Spray guns, Air compressors, Spray booths and complete paint finishing units. Baking ovens.

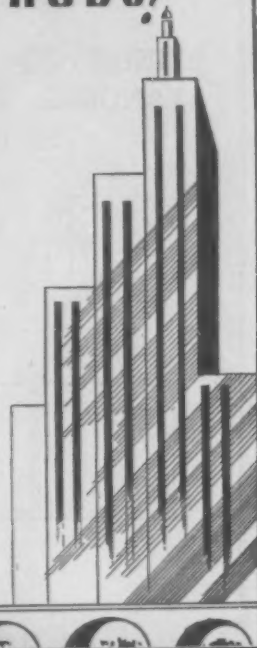
## J. HOLLAND & SONS, Inc.

276 South Ninth Street Brooklyn 11, N. Y.  
AT BROADWAY

## MODERN INDUSTRIAL CLEANING METHODS!

Removal of heavy oils, grease and drawing compounds from steel parts often presents a difficult problem, which no ordinary cleaning material will solve. AHCOLOID 70 produces the clean surface necessary for paint, phosphate coatings, electroplating or further fabrication.

And it does its work quickly, efficiently and economically.



**APOTHECARIES HALL CO.**

WATERBURY 88 CONN.



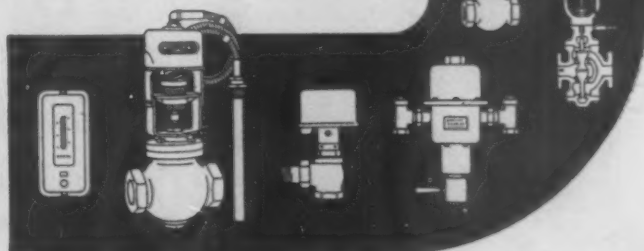
When you want accurate and dependable automatic temperature or humidity control for Industrial Processes or Air Conditioning Systems call in a Powers engineer. With a very complete line of self-operating and compressed air operated controls we are well equipped to fill your requirements.

**Write for Circular 2520**

**THE POWERS REGULATOR CO.**  
2779 Greenview Avenue, CHICAGO

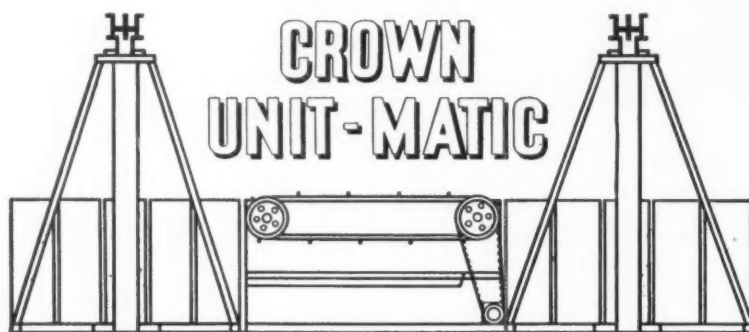
Offices in 47 Cities—See your phone directory

**50 Years** of Temperature and Humidity Control ★



# Crown

BRINGS TO THE PLATING INDUSTRY THE OUTSTANDING EQUIPMENT DEVELOPMENT DURING THE PAST QUARTER OF A CENTURY

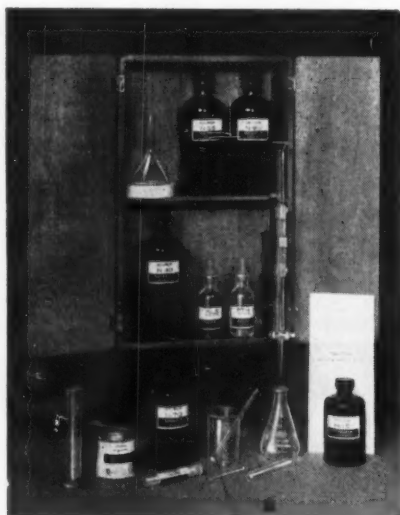


(PATENT APPLIED FOR)

**FULLY AUTOMATIC  
PARTIALLY AUTOMATIC  
EQUIPMENT**

**FOR**  
**PLATING**  
**ANODIZING**  
**CLEANING**  
**PICKLING**

**CROWN RHEOSTAT & SUPPLY CO.**  
3465 N. KIMBALL AVE. CHICAGO, ILL.



## GET READY

FOR THE RETURN OF  
DECORATIVE PLATING

Control Sets for Nickel, Chromium, Copper, Silver and other solutions available.

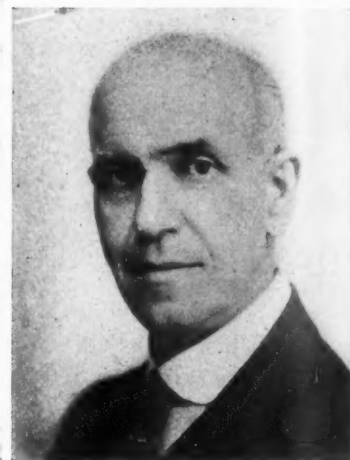
Write for Literature

**KOCOUR CO.**

4720 S. CHRISTIANA AVE.  
CHICAGO 32

Specify Kocour Sets from your supplier.

## Obituaries



Walter S. Barrows

Walter S. Barrows, Past President of the American Electroplaters' Society, passed away in Toronto, Ont., Canada on July 10, 1945. Mr. Barrows was one of the real lifetime members of the A. E. S., having served as president of the Society in 1915. He was not only well known in the Society but also in the entire plating industry.

### George N. Crouse

George N. Crouse, president of the Benedict Mfg. Co., East Syracuse, N. Y., and long a leader in Syracuse civic circles died at his home Saturday, July 7, 1945.

Mr. Crouse was born October 15, 1877, and was a life long resident of Syracuse.

His connection with the Silverware industry began in 1905, when he bought the controlling interest in the old M. S. Benedict Mfg. Co., and under his direction the company was reorganized as the T. N. Benedict Mfg. Co. The company is known to the trade as the Benedict Mfg. Co. with the trade name of Indestructo. Following the death of Mr. Harry L. Benedict in 1931, Mr. Crouse took over the active management of the company.

Mr. Crouse's fraternal affiliations were many and covered a long span of years. He was past master of Central City Lodge, past commander of Central City Commandery, 25, KT, a member of Rose Croix Chapter, Tigris Temple, Shrine, Kedar Khan Grotto and Central City Lodge of Perfection, of which he was thrice-potent master. He was also a past exalted ruler and life member of Syracuse Lodge 31—B.P.O.E., a past district deputy grand exalted ruler of B.P.O.E. and a past president of New York State Elks' association.

An early aviation enthusiast, Mr. Crouse made three trans-atlantic flights in the Graf Zeppelin and one flight in the DoX over South America. For several years he owned a private plane of his own.

## ODDS and ENDS

### The Printed Page:

We wonder how many of our readers have the same feeling of frustration which comes over us when we see an unidentified illustration in an ad? It may be a piece of equipment, photos of a process or a processed part, and we are often tempted to write the advertiser for clarification, only we are ashamed to ask because it might be something we're supposed to know.

How come *Corning Glass* is taking a bow for developing a new process for metallizing glass and ceramics, involving the application of a metallic paint which is fired in and acts as a plating base?? The silver-depositware people were doing this very same thing before we were born; and *Sam Wein* could probably dig up a reference on the subject for us, dating back almost to Civil War days. Reminds us of that radically new chromium plating process, a few years ago, which was anticipated by not one, but three, existing patents.

Headline in our daily paper: "POST WAR OUTLOOK FOUND UNCERTAIN." An amazing exhibition of mental acrobatics we call it and undoubtedly a conclusion reached only after an intensive survey of the "ear to the ground" type!

### Humor Dept.:

Asked the chief chemist, on hearing the crash of glassware hitting the laboratory floor: "More beakers?"

Answered the assistant chemist, viewing the shattered mess of an almost completed analysis: "No. Less!"

### How Much Do You Know?

(Prepared by George Black)

Designate the following as true or false:

1. Metal spraying is a process which is performed by forcing molten metal through the nozzle of a spray gun.
2. Welding operations may be performed before or after metal spraying.
3. Oxygen and acetylene are preferred to oxygen and hydrogen because of safety considerations.
4. Sprayed molten metal fuses and alloys with the surface on which it is sprayed.
5. Sandblasting should be performed with the nozzle at a 45 degree angle to the surface.
6. In applying several layers on sheet stock, metal spraying should be criss-crossed; each successive layer should be deposited at right angles to the preceding coating.
7. Sprayed coatings should be of coarse texture, but free from unatomized particles of metal.
8. Steel structural parts which have been sprayed with aluminum should be boiled for 30 minutes in a 15% solution of potassium dichromate.
9. The toxic effect of zinc fumes is cumulative in the system, while that of cadmium and lead is of temporary nature only.
10. The ribbon of metal deposited with each arc of the spray gun is heaviest at the center and tapers to nothing at the edges. Each succeeding ribbon should therefore overlap the one adjacent to it by approximately one-third the ribbon width.

See Answer Key on Page 358

### Live and Learn:

Shipping boxes have been developed for our armed forces which can be dropped from an airplane without a parachute and from a height of 10,000 feet or more without damage in 995 cases out of 1,000. Now if they can develop a hydrometer which will bounce back after hitting the floor, we'll have something.

A 16-inch Coast Artillery gun mount costs about \$750,000, which is just a little more than we earned last year. Plating the liner tubes with chromium is an interesting story if we ever could get someone to write it up.

### Thought for the Summer:

Doing nothing is very tiresome—you can't quit and rest!

## LaMOTTE CONTROL EQUIPMENT for the ELECTROPLATER and ELECTROTYPYER

As an aid in the control of plating baths of  
NICKEL, ACID ZINC, TIN, CYANIDE  
ACID COPPER, CADMIUM, BRASS and BRONZE



### LaMotte Block Comparators

for pH tests to accurately control the acidity and alkalinity of nickel, zinc, tin or cyanide baths. Inexpensive and easy to operate. A test can be made in a few minutes.

### LaMotte Acid-Copper Analytical Set

for accurately determining and regulating the acid and copper content of the bath to insure uniform results.

Other LaMotte Outfits for determining Chlorides, Nickel Content, Iron Content and positive control of Cyanide Copper, Acid Zinc, Cyanide Zinc, Cadmium, Brass and Bronze plating solutions.

Write for further information.

## LaMOTTE CHEMICAL PRODUCTS CO.

Originators of the Practical Application of pH Control  
DEPT. MF TOWSON 4, BALTIMORE, MD.

SAVE TIME  
MONEY AND  
REJECTS



## with FERRO PICKLE PILLS

Check pickling, neutralizing and metal cleaning solutions frequently! Keep them at top strength—and without wasting time or materials—with Ferro Pickle Pills.

With Ferro Pickle Pills, any workman can quickly determine the percentage of acid in his pickling tanks, the percentage of iron, exactly when to dump. He can also tell the strength of alkali in neutralizing baths . . . or the strength of a metal cleaning solution. Pills for still other tests are available, to order.

Write today, for full information.



## FERRO ENAMEL CORP.

Pickling Division

4150 EAST 56 STREET • CLEVELAND 5, OHIO



# HORIZONTAL *Nickel Plating* BARREL

MAC DERMID INCORPORATED are pleased to be able to recommend the Horizontal Nickel Plating Barrel illustrated because of its many outstanding features.

The Horizontal Nickel Plating Barrel is one of the many modern cleaning, finishing, and plating assemblies sold exclusively by MAC DERMID INCORPORATED in New England.

WRITE FOR FREE FOLDERS

Large, double welded tank (leak proof construction) lined with Koroseal, will accommodate heating or cooling coils as required, as well as an easily controlled volume of plating solution.

Plating Cylinder Assembly hangs deeply in the tank so that the inside of the cylinder is completely submerged for greater carrying capacity and faster plating.

Push Button motor starter switch with thermal overload relay. Can be mounted anywhere.

Heavy, shock resistant, acid resisting bakelite panels for great strength and long life—milled to make tight fit with rails and cylinder heads. Panels reinforced by  $\frac{1}{2}$ " diameter steel rods, rubber covered.

$\frac{3}{4}$ " thick bakelite cylinder heads, slotted for perfect fit with panels and rails.

Large, steel bridge member holds cylinder rigidly in alignment and supports it and load.

Rails made of  $1\frac{1}{4}$ " square bakelite with a  $\frac{1}{2}$ " diameter steel rod thru the center for reinforcement and running the entire length. Rails are milled to suit the panels insuring a good fit.

Flexible type, cathode contacts shown are standard for small work. We supply other types of contacts to meet requirements. Contacts are easily—quickly removed for cleaning.

Heavy, cast brass contact saddles, machined for perfect contact with cathode horns. Self locking feature prevents barrel from rocking.

One third HP, rubber mounted motor rotates plating cylinder through special 60 to 1 speed reducer mounted on adjustable base plate.

Solid copper cathode lead, enclosed in hard rubber. Cathode lead is separate from hanger so that neither cylinder nor bearing is charged cathodically, thus eliminating treeing. Cathode lead is easily removed.

Main Gear is made of tough bakelite and pinion gears are made of alloy steels hardened and ground for longer life.

Contact horns, fastened to hanger, connect cathode bus bar with cathode lead and support cylinder firmly in saddles at four points—two on either side.

Cylinder rotates on corrosion resistant non-treeing bearings. The cathode arbors are independent of the bearings.

MAC DERMID INC

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